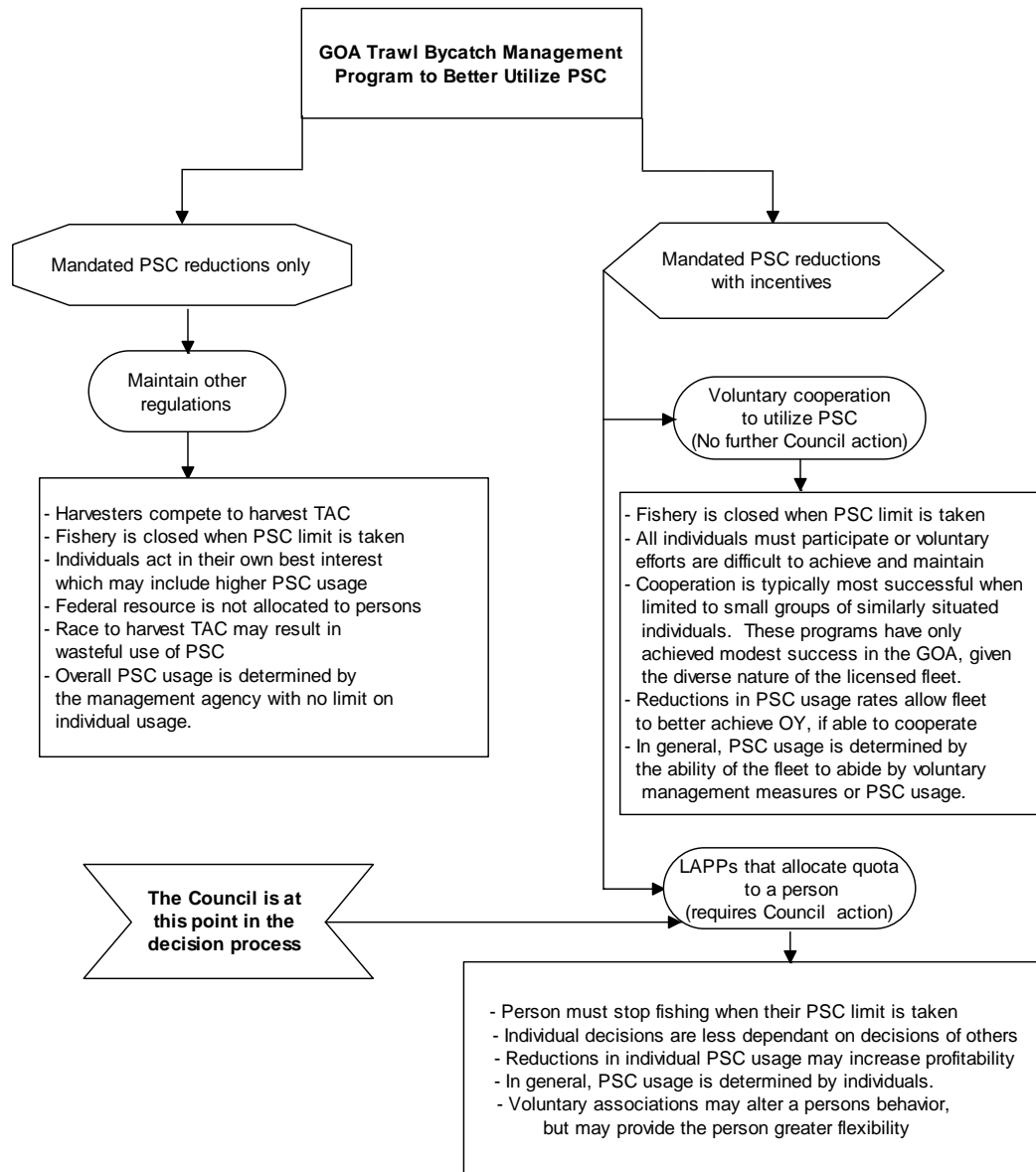


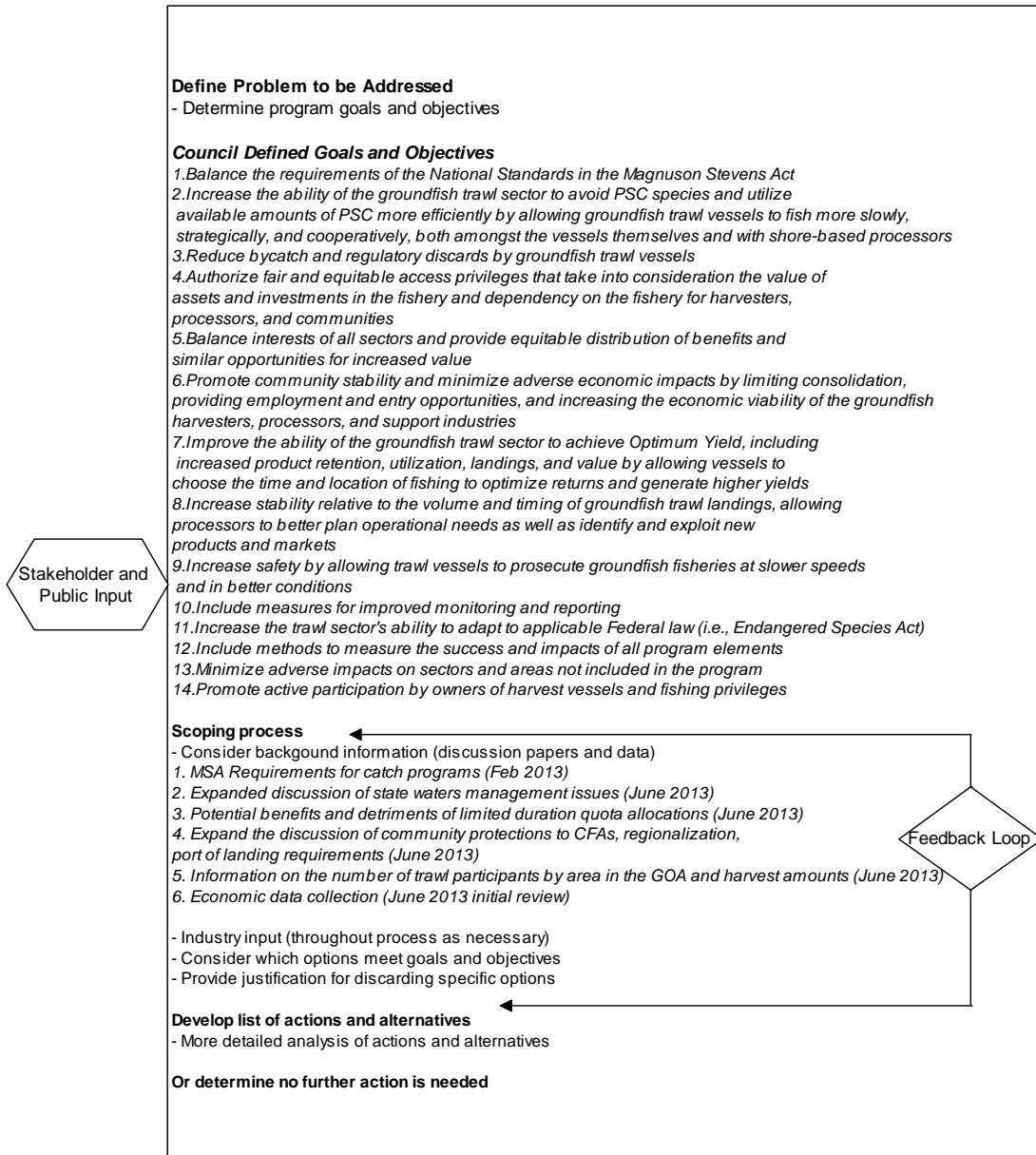
*Agenda Item C-5(a)*  
*GOA Trawl Bycatch Management Discussion Papers and Roadmap*  
*June 2013*

At its February 2013 meeting, the Council requested that staff provide additional information on specific issues to help guide future GOA Trawl Bycatch Management discussions. The Council requested information on four specific topics. The first is a roadmap of the process that might be used by the Council. That chart is provided in Section 1. The first three pages of that section define a general roadmap. The next two pages are tier 1 decisions the Council must make if they move forward with a catch share program. Remaining sections of the roadmap focus on decisions that must be made after the tier 1 decisions are selected and the very detail decisions that follow the higher level decisions. Section 2 is a presentation of historic participation data in the Central and Western GOA trawl fisheries. Section 3 is a discussion of State Waters management issues. Section 4 provides a discussion of the benefits and detriments of limited duration quota allocations, including non-monetary auctions. Finally, Section 5 presents a discussion of potential community protection measures.

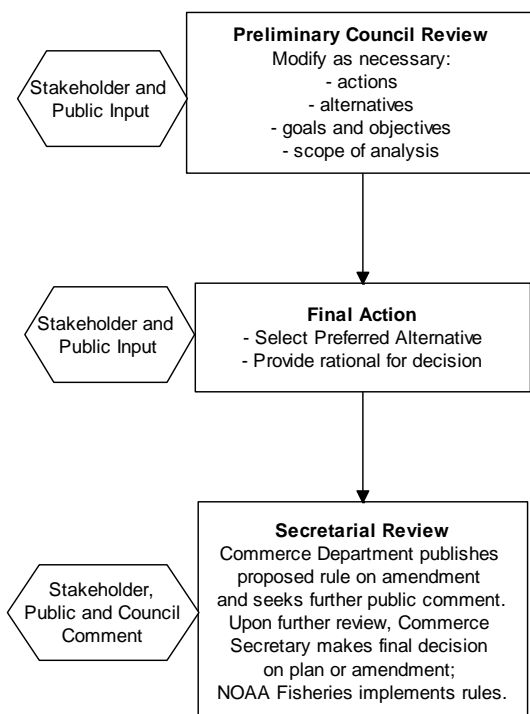
## 1 Decision Tree for GOA Trawl Bycatch Management

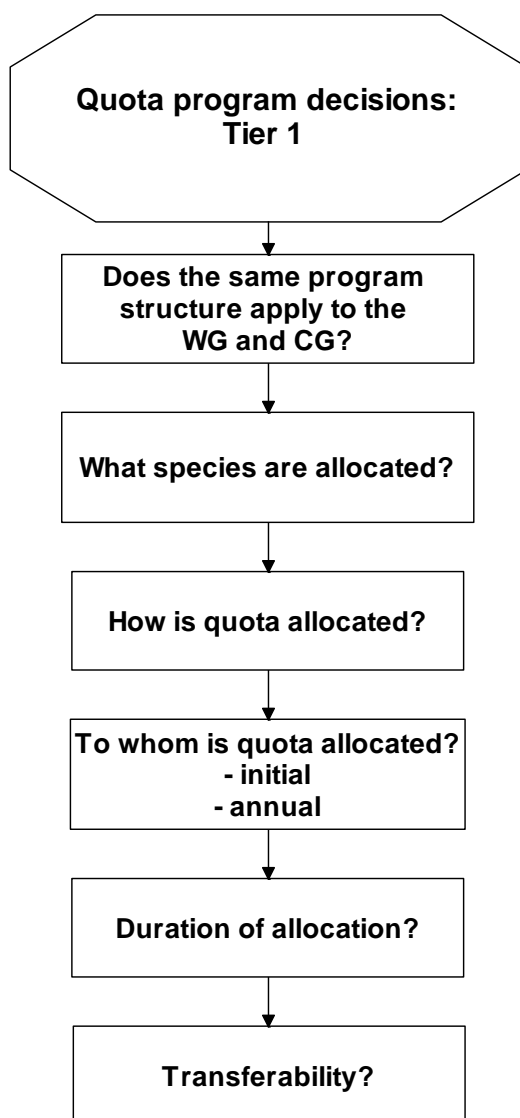


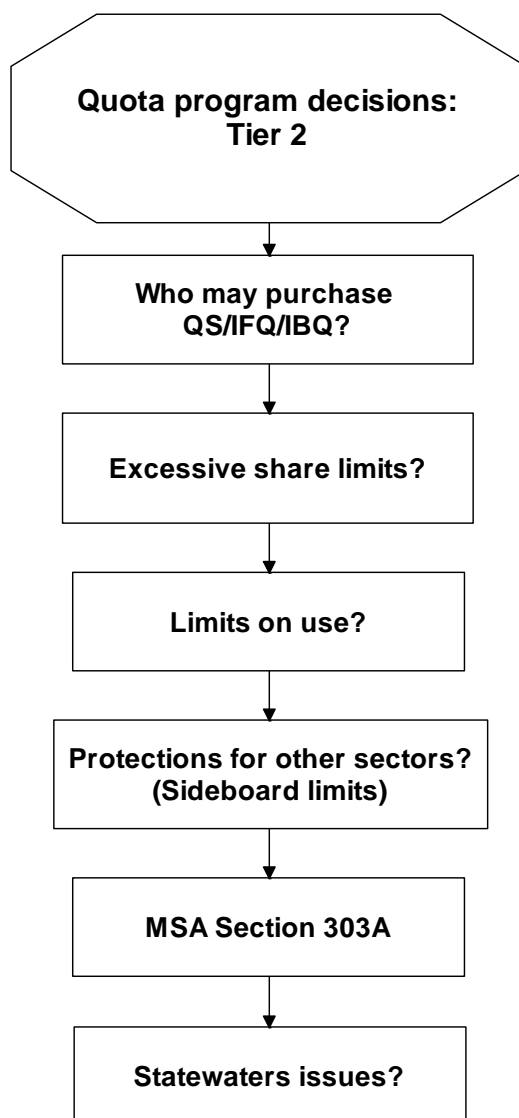
## Trawl Bycatch Management Program Development



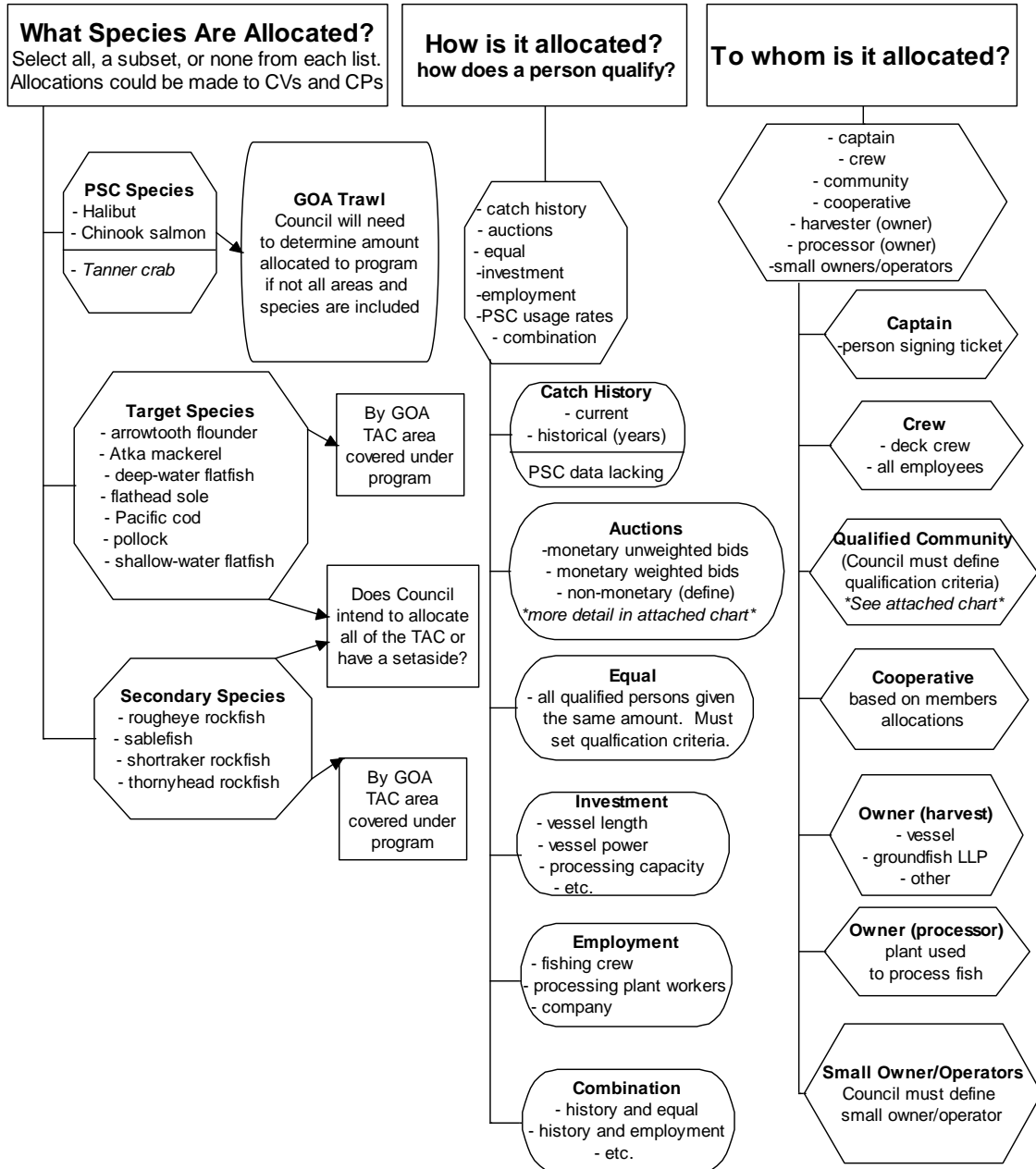
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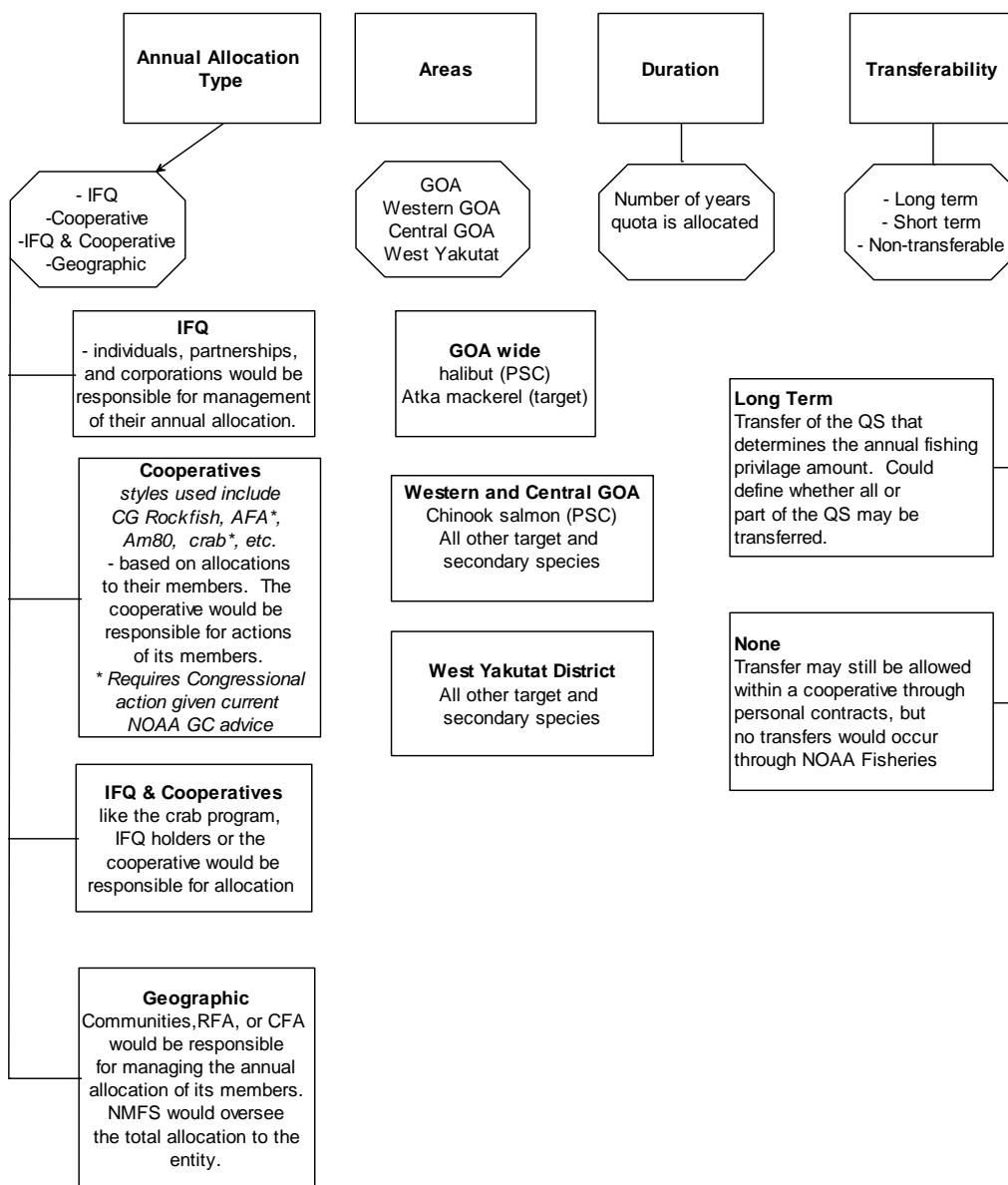




**LAPPs that allocate quota to a person**  
(Council's tier 1 decisions if program is moved forward)

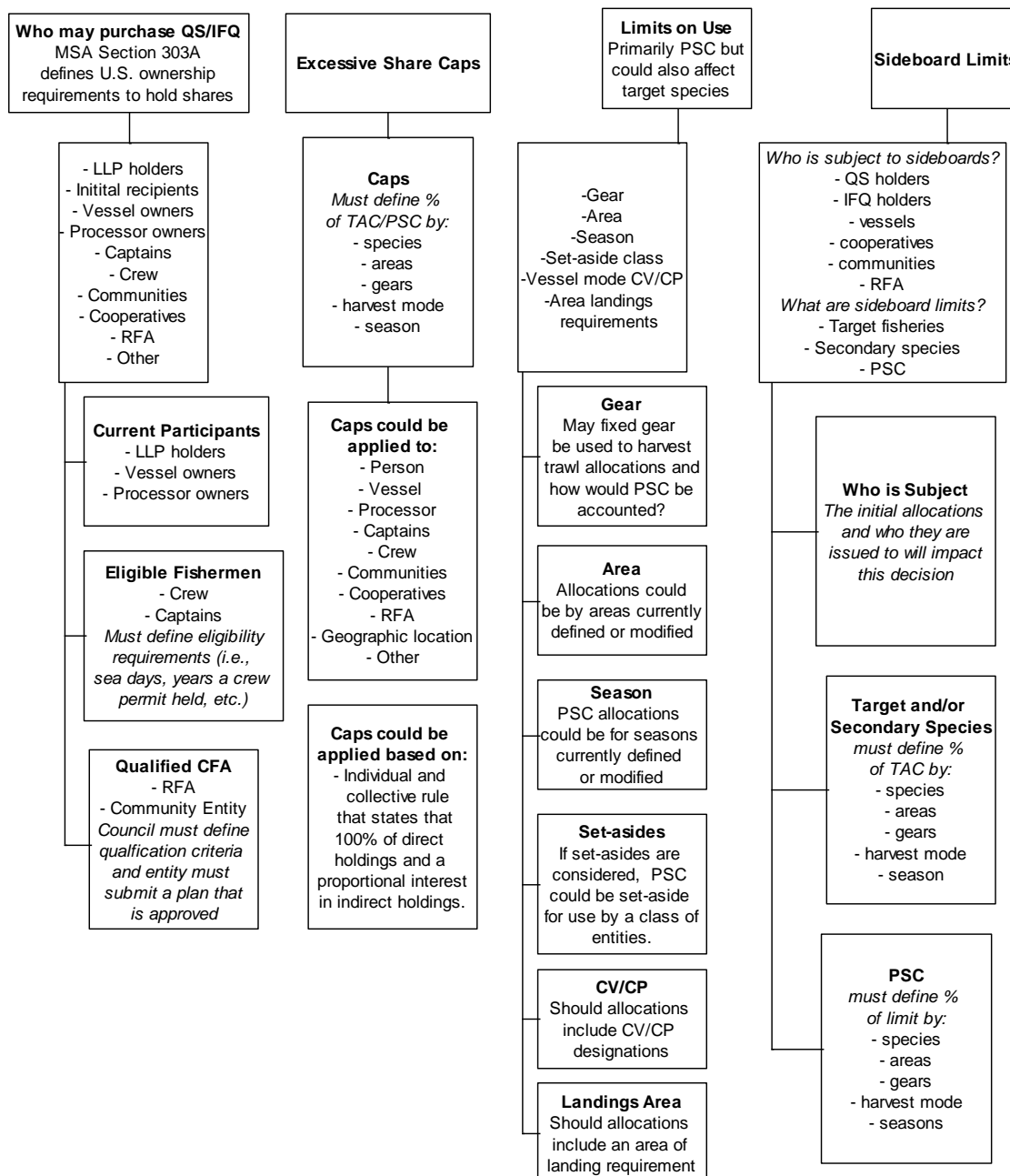


**LAPPs that allocate PSC to a person**  
(Council's tier 1 decisions if program is moved forward)

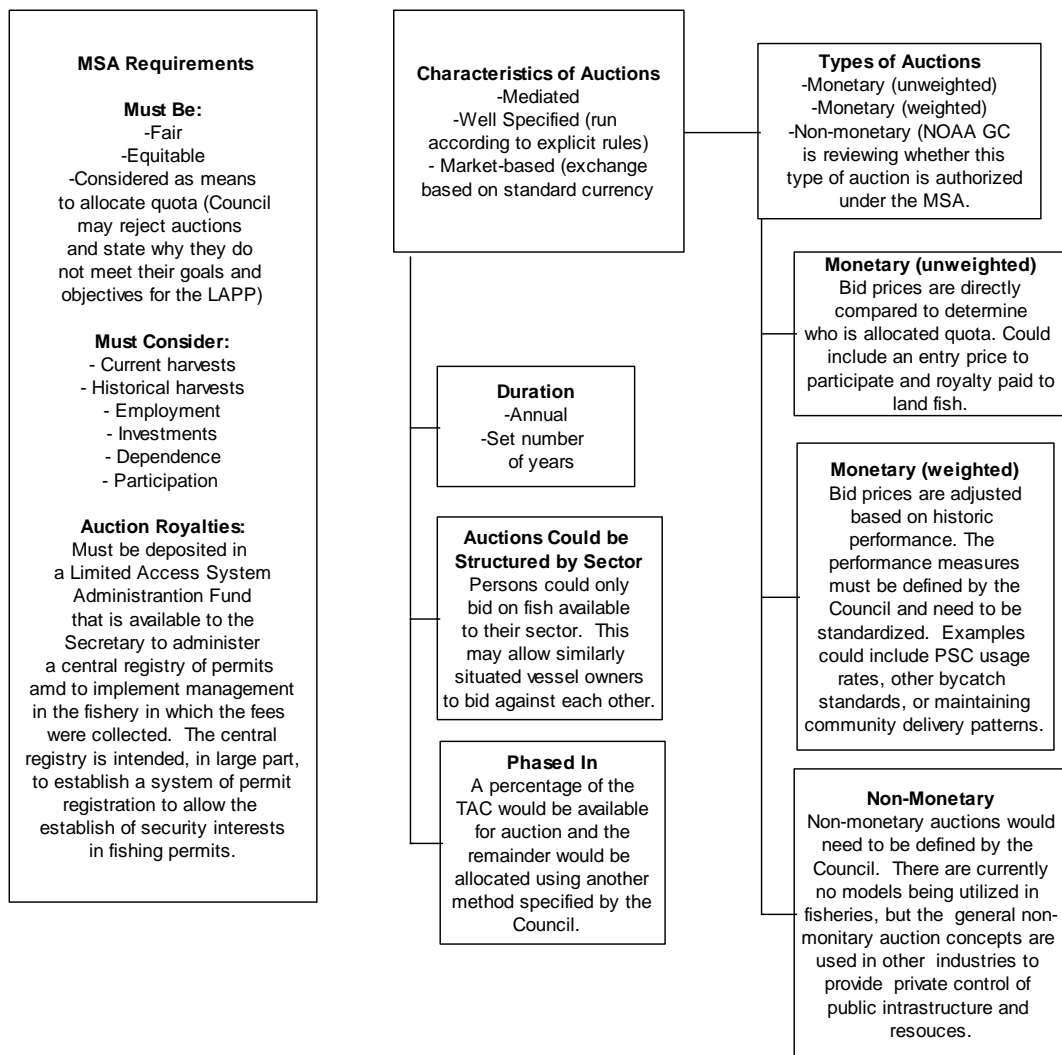


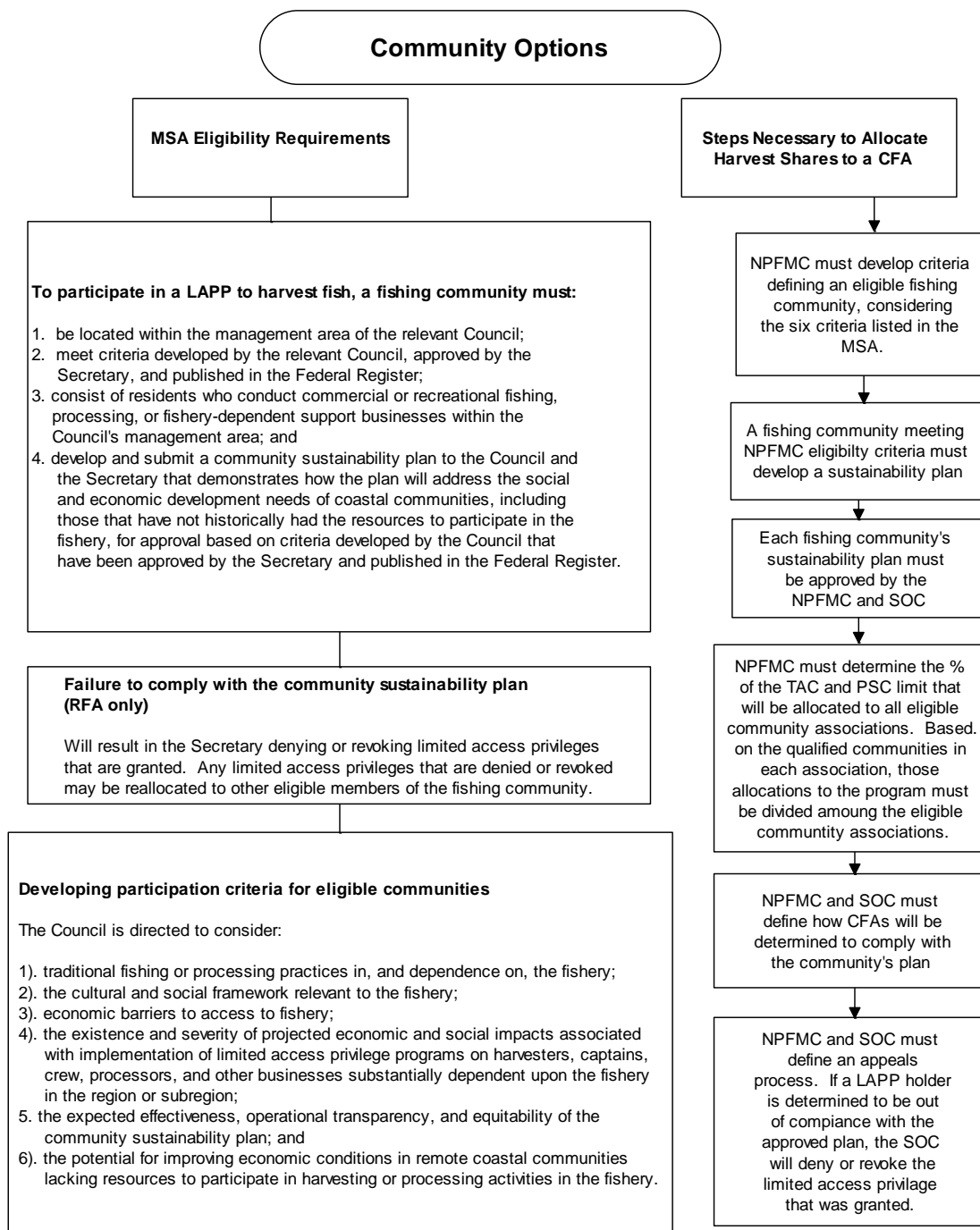


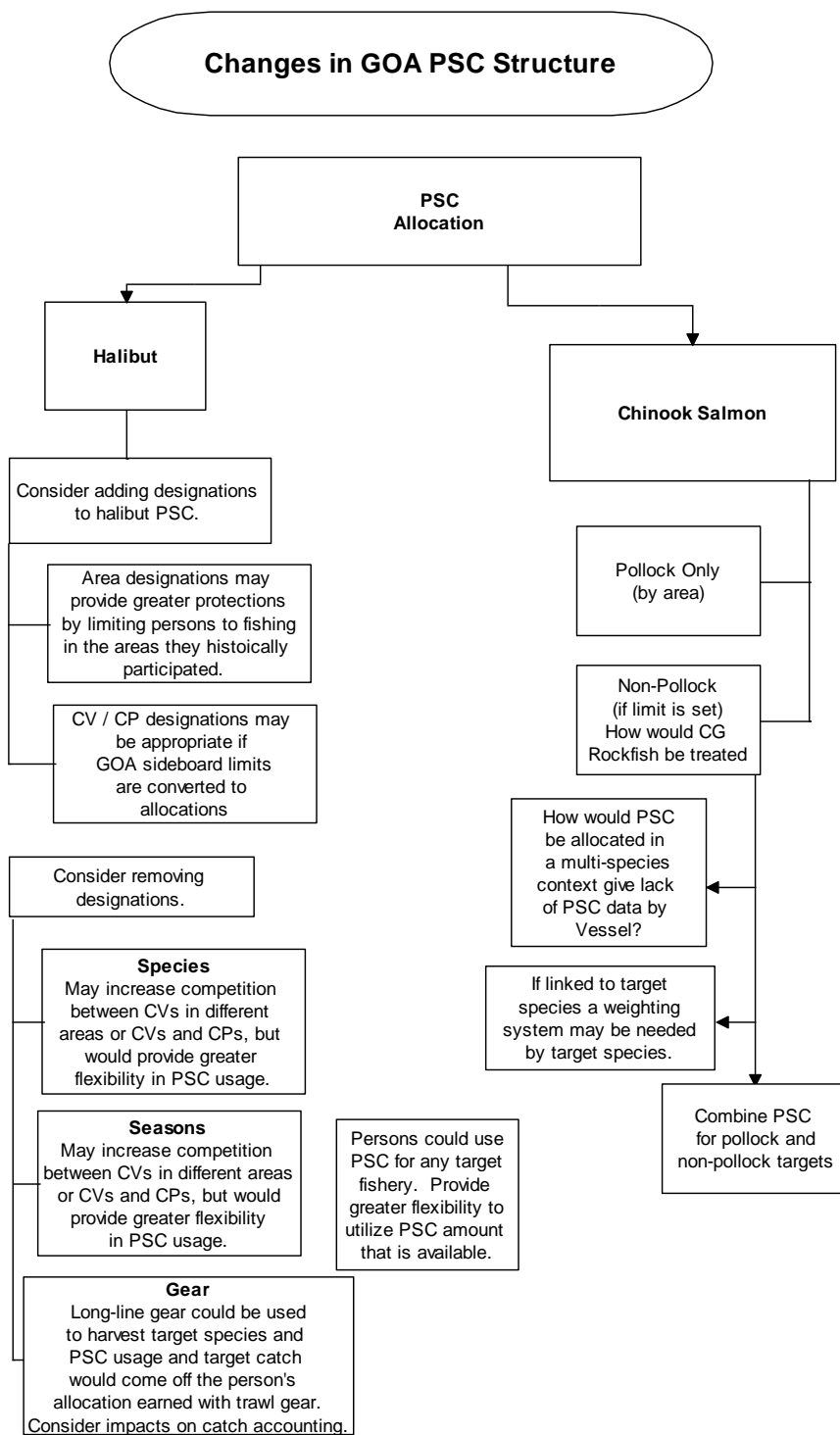
**LAPPs that allocate quota to a person**  
(Council's tier 2 decisions: dependent on tier 1 decisions)



## Auctions







## **2 Western and Central GOA LLP and Participation Data**

These data were provide by AKFIN and based on the groundfish LLP database and eLandings.

Information in included a Central GOA and/or Western GOA trawl endorsement. Because participation in Federal fisheries is limited by these licenses, it represents the maximum number of participants in these fisheries. Additional vessels could participate in State waters fisheries that do not require a federal groundfish permit (GHL fisheries). Conversely, the actual number of participants is reduced if more than one license is stacked on a vessel, or an LLP holder chooses not to participate in a fishery for which they hold an LLP.

The table shows that 95 LLPs have a trawl endorsement for the Central GOA and 74 licenses have an endorsement for the Western GOA. A total of 57 licenses have both a Western and Central GOA trawl endorsement, meaning that 17 licenses only have a Western GOA trawl endorsement and 38 licenses only have a Central GOA trawl endorsement. Reading across the "CG\_TRW" row shows the number of other endorsements on those 95 licenses. For example, there are four CG Pacific cod endorsements and 13 WG Pacific cod endorsements for CV pot gear. The 74 LLPs with a WG trawl endorsement also had two CG Pacific cod endorsements and 19 WG Pacific cod endorsements for CV pot gear.

**Table 2-1** shows the number of groundfish LLPs and their associated endorsements that included a Central GOA and/or Western GOA trawl endorsement. Because participation in Federal fisheries is limited by these licenses, it represents the maximum number of participants in these fisheries. Additional vessels could participate in State waters fisheries that do not require a federal groundfish permit (GHL fisheries). Conversely, the actual number of participants is reduced if more than one license is stacked on a vessel, or an LLP holder chooses not to participate in a fishery for which they hold an LLP.

The table shows that 95 LLPs have a trawl endorsement for the Central GOA and 74 licenses have an endorsement for the Western GOA. A total of 57 licenses have both a Western and Central GOA trawl endorsement, meaning that 17 licenses only have a Western GOA trawl endorsement and 38 licenses only have a Central GOA trawl endorsement. Reading across the “CG\_TRW” row shows the number of other endorsements on those 95 licenses. For example, there are four CG Pacific cod endorsements and 13 WG Pacific cod endorsements for CV pot gear. The 74 LLPs with a WG trawl endorsement also had two CG Pacific cod endorsements and 19 WG Pacific cod endorsements for CV pot gear.

Table 2-1 Groundfish LLPs and endorsements (2013)

	AI_TRW	BS_TRW	CG_TRW	WG_TRW	AI_CP_PCOD_HAL	AI_CP_PCOD_POT	AI_CV_PCOD_HAL	AI_CV_PCOD_POT	BS_CP_PCOD_HAL	BS_CP_PCOD_POT	BS_CV_PCOD_HAL	BS_CV_PCOD_POT	CG_CP_PCOD_HAL	CG_CP_PCOD_POT	CG_CV_PCOD_HAL	CG_CV_PCOD_POT	CG_CV_PCOD_JIG	WG_CP_PCOD_HAL	WG_CP_PCOD_POT	WG_CV_PCOD_HAL	WG_CV_PCOD_POT	WG_CV_PCOD_JIG
AI_TRW	22	22	14	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BS_TRW	22	63	48	42	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0
CG_TRW	14	48	95	57	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	13	0
WG_TRW	17	42	57	74	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	19	0
AI_CP_PCOD_HAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AI_CP_PCOD_POT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AI_CV_PCOD_HAL	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
AI_CV_PCOD_POT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BS_CP_PCOD_HAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BS_CP_PCOD_POT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BS_CV_PCOD_HAL	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
BS_CV_PCOD_POT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CG_CP_PCOD_HAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CG_CP_PCOD_POT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CG_CV_PCOD_HAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
CG_CV_PCOD_POT	0	1	4	2	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0
CG_CV_PCOD_JIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WG_CP_PCOD_HAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WG_CP_PCOD_POT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WG_CV_PCOD_HAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WG_CV_PCOD_POT	0	2	13	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0
WG_CV_PCOD_JIG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2-2 shows that 17 LLPs for use by C/Ps were issued with a WG trawl endorsement and the same number (17) C/P licenses were issued with a CG trawl endorsement. Recall that a C/P license may be used when a vessel is operating as a C/P or a CV.

**Table 2-2 LLPs with western or central GOA trawl endorsement, by operating mode**

License Type	AI	BS	CG	WG
CV	3	40	78	57
C/P	19	23	17	17
<b>Total</b>	<b>22</b>	<b>63</b>	<b>95</b>	<b>74</b>

Source: RAM LLP database (2013)

Table 2-3 shows participation in the GOA trawl fishery by area. The top section of the table provides the number of vessels that participated in the trawl fishery during the year. The second section of the table reports the metric tons of groundfish harvested by those vessels, when using trawl gear. Finally, the last two sections provide estimates of the PSC by those vessels.

**Table 2-3 Vessels with western or central GOA trawl harvest, participation by area (2008 through 2012)**

	2008	2009	2010	2011	2012	Average	St. Dev
Vessels							
WY	6	12	21	20	16	15	6
CG	56	52	53	59	70	58	6
WG	40	45	42	40	47	43	7
<b>Total</b>	<b>87</b>	<b>89</b>	<b>84</b>	<b>85</b>	<b>87</b>	<b>86</b>	<b>3</b>
Groundfish Harvest (mt)							
WY	2,623	2,727	3,938	4,480	4,063	3,566	839
CG	92,083	76,634	105,066	116,530	124,994	103,061	19,270
WG	29,129	25,441	38,017	29,813	40,743	32,629	6,456
<b>Total</b>	<b>123,834</b>	<b>104,802</b>	<b>147,021</b>	<b>150,823</b>	<b>169,800</b>	<b>139,256</b>	<b>25,258</b>
Chinook Salmon PSC							
WY	712	187	506	144	188	347	250
CG	12,826	7,173	20,766	17,114	14,060	14,388	5,067
WG	2,397	558	33,073	4,346	8,102	9,695	13,364
<b>Total</b>	<b>15,935</b>	<b>7,917</b>	<b>54,345</b>	<b>21,604</b>	<b>22,350</b>	<b>24,430</b>	<b>17,692</b>
Halibut PSC (mt) by Area							
WY	3	5	4	7	3	4	2
CG	1,720	1,700	1,564	1,741	1,519	1,649	100
WG	229	126	72	108	191	145	64
<b>Total</b>	<b>1,952</b>	<b>1,831</b>	<b>1,640</b>	<b>1,856</b>	<b>1,713</b>	<b>1,798</b>	<b>123</b>

Table 2-4 shows the GOA trawl activity by operation type. The same types of information are reported as in Table 2-3, except the data are reported by catcher vessel (CV) and catcher processor (CP) mode of operation.



**Table 2-4 Vessels with western or central GOA trawl harvest, participation by operating mode (2008 through 2012)**

	2008	2009	2010	2011	2012	Average	St. Dev
Vessels							
CP	14	18	17	17	17	17	2
CV	73	71	67	68	70	70	2
<b>Total</b>	<b>87</b>	<b>89</b>	<b>84</b>	<b>85</b>	<b>87</b>	<b>86</b>	<b>2</b>
Groundfish Harvest (mt)							
CP	23,306	23,695	24,484	28,394	26,930	25,362	2,204
CV	100,528	81,108	122,537	122,430	142,869	113,894	23,668
<b>Total</b>	<b>123,834</b>	<b>104,802</b>	<b>147,021</b>	<b>150,823</b>	<b>169,800</b>	<b>139,256</b>	<b>25,258</b>
Chinook Salmon PSC							
CP	2,967	2,410	4,683	3,021	1,950	3,006	1,035
CV	12,968	5,508	49,662	18,583	20,400	21,424	16,818
<b>Total</b>	<b>15,935</b>	<b>7,917</b>	<b>54,345</b>	<b>21,604</b>	<b>22,350</b>	<b>24,430</b>	<b>17,692</b>
Halibut PSC (mt)							
CP	456	473	516	510	388	469	52
CV	1,496	1,358	1,123	1,346	1,325	1,330	134
<b>Total</b>	<b>1,952</b>	<b>1,831</b>	<b>1,640</b>	<b>1,856</b>	<b>1,713</b>	<b>1,798</b>	<b>123</b>

Table 2-5 reports trawl activity in the GOA by vessel length. All of the vessels in the less than 60 feet LOA class are catcher vessels. Caution should be used when comparing PSC rates between the two length classes of vessels. Recall that vessels less than 60 feet LOA were not required to carry observers, so PSC rates from observed vessels were applied. Therefore, actual PSC by those vessels does not represent the actual PSC rates by those vessels. The actual rates could be higher or lower than reported.

**Table 2-5 Vessels with western or central GOA trawl harvest, participation by vessel length (2008 through 2012)**

	2008	2009	2010	2011	2012	Average	St. Dev
Vessels							
<60	27	27	24	23	23	25	2
≥60	60	62	60	62	64	62	2
<b>Total</b>	<b>87</b>	<b>89</b>	<b>84</b>	<b>85</b>	<b>87</b>	<b>86</b>	<b>2</b>
Groundfish Harvest (mt)							
<60	20,467	15,809	26,575	21,364	33,447	23,532	6,732
≥60	103,367	88,993	120,446	129,459	136,353	115,724	19,389
<b>Total</b>	<b>123,834</b>	<b>104,802</b>	<b>147,021</b>	<b>150,823</b>	<b>169,800</b>	<b>139,256</b>	<b>25,258</b>
Chinook Salmon PSC							
<60	2,216	651	27,313	3,501	6,759	8,088	10,980
≥60	13,719	7,267	27,031	18,103	15,591	16,342	7,197
<b>Total</b>	<b>15,935</b>	<b>7,917</b>	<b>54,345</b>	<b>21,604</b>	<b>22,350</b>	<b>24,430</b>	<b>17,692</b>
Halibut PSC (mt)							
<60	153	93	55	40	194	107	65
≥60	1,799	1,738	1,585	1,816	1,518	1,691	133
<b>Total</b>	<b>1,952</b>	<b>1,831</b>	<b>1,640</b>	<b>1,856</b>	<b>1,713</b>	<b>1,798</b>	<b>123</b>

Table 2-6 provides vessel counts by area, mode, vessel length, and target fishery. This table provides a substantial amount of detail on the directed fisheries vessels were active in during the

years considered. For example, it shows that western GOA CVs less than 60 feet LOA only participate in pollock and Pacific cod fisheries. The table does not break out seasonal harvest.

**Table 2-6 Vessel counts with western or central GOA trawl harvest, participation by area, mode, length and target fishery (2008 through 2012)**

WY	CP	Vessel Length	Target	# Vessels				
				2008	2009	2010	2011	2012
WY	CP	≥ 60	<b>TOTAL</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>
			Pollock (bottom)		1			
			Rockfish	1	3	2	2	1
			Sablefish		1	1		
	CV	<60	<b>TOTAL</b>					<b>1</b>
			Rockfish					1
		≥ 60	<b>TOTAL</b>	<b>5</b>	<b>9</b>	<b>19</b>	<b>18</b>	<b>14</b>
			Pollock (midwater)	4	3	15	12	11
			Pollock (bottom)	3	7	6	8	3
			Rockfish	1		2	2	1
CG	CP	≥ 60	<b>TOTAL</b>	<b>10</b>	<b>12</b>	<b>10</b>	<b>8</b>	<b>8</b>
			Pollock (bottom)				1	1
			Pacific Cod	1	3			1
			Rockfish	6	8	8	5	5
			Arrowtooth Flounder	5	2	2	5	5
			Flathead Sole	2	2	2	1	1
			Rex Sole	3	6	4	3	3
			Shallow Water Flatfish		2	1	1	1
			Atka Mackerel			1	1	
	CV	<60	<b>TOTAL</b>	<b>3</b>	<b>1</b>	<b>5</b>	<b>8</b>	<b>17</b>
			Pollock (midwater)	1		4	7	12
			Pollock (bottom)	1	1	2	1	11
			Pacific Cod	2	1	3	3	10
			Rockfish	1	1	1		1
			Arrowtooth Flounder	1	1	1	1	1
			Shallow Water Flatfish	1	1	2	1	2
		≥ 60	<b>TOTAL</b>	<b>43</b>	<b>39</b>	<b>38</b>	<b>43</b>	<b>45</b>
			Pollock (midwater)	40	39	36	40	45
			Pollock (bottom)	32	26	27	26	27
			Pacific Cod	39	33	35	38	37
			Rockfish	26	25	26	25	27
			Arrowtooth Flounder	29	26	24	28	22
			Flathead Sole	7	6	8	8	3
			Rex Sole	3	6	2	2	2
			Shallow Water Flatfish	29	29	22	19	25
			Deep Water Flatfish	1	1	3	1	
			Sablefish	13	15	12	13	12
			Other Species	4	5	2	1	1
WG	CP	≥ 60	<b>TOTAL</b>	<b>11</b>	<b>14</b>	<b>13</b>	<b>14</b>	<b>15</b>
			Pollock (bottom)				2	
			Pacific Cod	2	2	1	1	3
			Rockfish	10	13	11	11	15
			Arrowtooth Flounder	4	3	1	4	3
			Flathead Sole	2	1	3	2	1
			Rex Sole	1	2	2	1	1
			Shallow Water Flatfish		1			
	CV	<60	<b>TOTAL</b>	<b>25</b>	<b>26</b>	<b>22</b>	<b>21</b>	<b>22</b>
			Pollock (midwater)	16	17	19	17	19
			Pollock (bottom)	14	14	20	19	20
			Pacific Cod	23	25	13	10	20
		≥ 60	<b>TOTAL</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>5</b>	<b>10</b>
			Pollock (midwater)	3	5	5	4	7
			Pollock (bottom)	2	2	6	4	8
			Pacific Cod			2	2	4
			Rockfish	1				

Table 2-7 shows the five-year average participation of trawl vessels in the GOA from 2008 through 2012. The table shows that outside of pollock, Pacific cod, and rockfish, catcher vessels tend to focus on arrowtooth flounder and shallow-water flatfish. C/Ps also participate in rex sole.

**Table 2-7 Vessels with western or central GOA trawl harvest, five-year average participation in the GOA trawl fisheries (2008 through 2012)**

Target	Area	Type	Length	# Vessels	Harvest (mt)	Chnk. PSC (# fish)	Hal. PSC (mt)
Pollock (midwater)	WY	CV	≥60	9	1,114	94	0.01
		WY Total		9	1,114	94	0.01
		CV	<60	6	2,004	479	0.51
	CG		≥60	40	36,338	6,551	6.31
		CG Total		46	38,343	7,031	7
		CV	<60	18	9,545	1,003	0.56
	WG		≥60	5	2,234	329	0.03
		WG Total		23	11,779	1,333	1
Pollock (bottom)	WY	CP	≥60	1	C	C	C
		CV	≥60	5	638	129	0.46
		WY Total		6	C	C	C
	CG	CP	≥60	1	C	C	C
		CV	<60	3	370	200	3.26
			≥60	28	6,763	1,682	48.31
		CG Total		32	C	C	C
	WG	CP	≥60	2	C	C	C
		CV	<60	17	7,725	6,410	2.47
			≥60	4	2,075	1,413	0.30
		WG Total		23	C	C	C
Rockfish	WY	CP	≥60	2	C	C	C
		CV	<60	1	C	C	C
			≥60	2	C	C	C
		WY Total		5	2,032	133	4.19
	CG	CP	≥60	6	6,592	330	26.14
		CV	<60	1	C	C	C
			≥60	26	8,672	880	15.16
		CG Total		33	C	C	C
	WG	CP	≥60	12	6,448	212	38.52
		CV	≥60	1	C	C	C
		WG Total		13	C	C	C
Arrowtooth Flounder	CG	CP	≥60	4	5,514	700	143.74
		CV	<60	1	C	C	C
			≥60	26	13,323	1,086	351.09
		CG Total		31	C	C	C
	WG	CP	≥60	3	770	193	21.71
		WG Total		3	770	193	21.71
Pacific Cod	CG	CP	≥60	2	125	1	7.12
		CV	<60	4	553	10	18.58
			≥60	36	10,689	476	332.24
		CG Total		42	11,367	487	357.94
	WG	CP	≥60	2	247	49	6.96
		CV	<60	18	2,964	71	56.68
			≥60	3	370	0	4.50
		WG Total		23	3,582	120	68.13
Shallow Water Flatfish	CG	CP	≥60	1	C	C	C
		CV	<60	1	C	C	C
			≥60	25	6,807	615	415.51
		CG Total		27	7,580	671	450.69
	WG	CP	≥60	1	C	C	C
		WG Total		1	C	C	C
Rex Sole	CG	CP	≥60	4	2,841	1,236	151.79
		CV	≥60	3	279	92	9.18
		CG Total		7	3,119	1,327	160.97
	WG	CP	≥60	1	C	C	C
		WG Total		1	C	C	C
Flathead Sole	CG	CP	≥60	2	C	C	C
		CV	≥60	6	440	2	36.90
		CG Total		8	C	C	C
	WG	CP	≥60	2	207	42	12.22
		WG Total		2	207	42	12.22
Sablefish	WY	CP	≥60	1	C	C	C
		WY Total		1	C	C	C
	CG	CV	≥60	13	248	0	3.33
		CG Total		13	248	0	3.33
Deep Water Flatfish	CG	CV	≥60	2	128	0	0.00
		CG Total		2	128	0	0.00
Atka Mackerel	CG	CP	≥60	1	C	C	C
		CG Total		1	C	C	C
Other Species	CG	CV	≥60	3	20	0	0.46
		CG Total		3	20	0	0.46
<b>GOA Total</b>				<b>86</b>	<b>144,218</b>	<b>25,337</b>	<b>1,859.18</b>

Table 2-8 shows the catch by target fishery that occurred in state and federal waters, from 2009 through 2012. State water harvests tend to focus on the fisheries that catcher vessels are most active. Primarily pollock is harvested from state waters, with limited amounts of Pacific cod in the western GOA. In the central GOA, small amounts of arrowtooth flounder and shallow-water flatfish are also harvested from state waters.

**Table 2-8 Vessels with western or central GOA trawl harvest, Federal versus State water breakout of 2009 through 2012 GOA trawl data by area.**

			2009				2010				2011				2012			
Area	Fed/State Waters	Target	# Vessels	Harvest (mt)	Chnk. PSC (# fish)	Hal. PSC (mt)	# Vessels	Harvest (mt)	Chnk. PSC (# fish)	Hal. PSC (mt)	# Vessels	Harvest (mt)	Chnk. PSC (# fish)	Hal. PSC (mt)	# Vessels	Harvest (mt)	Chnk. PSC (# fish)	Hal. PSC (mt)
WY	Federal	Pollock (midwater)	3	346	21	0.01	15	1,158	192	0.03	12	1,314	59	0.00	11	1,898	77	0.00
		Pollock (bottom)	8	867	38	0.02	6	455	247	0.02	8	1,051	51	1.04	3	466	43	0.00
		Rockfish	3	1,479	128	5.32	4	2,178	67	3.74	4	2,114	35	6.23	3	1,699	68	3.22
		Sablefish	1	C	C	C	1	C	C	C								
WY Total			12	C	C	C	21	C	C	C	20	4,480	144	7.27	16	4,063	188	3.22
CG	Federal	Pollock (midwater)	36	10,747	966	0.71	39	29,616	7,249	1.34	46	41,135	7,825	9.17	49	52,887	7,083	6.49
		Pollock (bottom)	26	4,052	725	33.70	27	4,778	2,754	14.87	28	9,111	1,529	89.84	28	3,367	361	48.50
		Pacific Cod	37	5,881	101	235.26	38	14,688	435	237.65	41	10,916	1,009	409.43	48	12,521	553	403.85
		Rockfish	34	13,077	1,072	30.58	35	16,615	1,216	55.00	30	14,857	755	44.11	33	19,017	1,145	35.89
		Arrowtooth Flounder	29	14,039	6	273.97	27	15,409	3,158	401.94	34	28,496	3,012	776.59	28	16,967	312	566.08
		Flathead Sole	8	1,416	118	49.83	9	2,070	352	151.32	9	687	21	45.15	4	1,101	0	117.17
		Rex Sole	12	6,029	1,911	267.83	6	3,565	2,299	245.79	5	1,987	1,354	108.06	5	1,980	981	77.21
		Shallow Water Flatfish	32	12,256	1,744	797.47	25	6,919	998	435.10	21	3,385	82	245.82	28	4,221	236	258.91
		Deep Water Flatfish	1	C	C	C	3	175	0	0.00	1	C	C	C				
		Atka Mackerel					1	C	C	C	1	C	C	C				
		Sablefish	15	318	0	2.08	12	157	0	2.90	13	225	0	4.03	12	235	0	3.15
		Other Species	5	38	0	1.22	2	12			1	C	C	C	1	C	C	C
		Federal Subtotal		51	C	C	C	53	C	C	C	58	111,148	15,673	1,732.65	66	C	C
	State	Pollock (midwater)	29	7,847	576	0.28	34	9,710	2,536	12.13	33	4,565	1,647	2.65	47	12,322	3,325	0.36
		Pollock (bottom)	11	747	287	14.76	11	1,198	620	2.06	7	776	94	10.08	14	345	336	2.78
		Arrowtooth Flounder	5	106	0	4.15	2	49	8	1.65	2	C	C	C	1	C	C	C
		Flathead Sole					1	19		1.14	1	C	C	C				
	State Subtotal		5	56	5	4.10	2	83	14	3.79	1	C	C	C	2	C	C	C
	CG Total			31	8,756	868	23.29	36	11,060	3,178	20.77	34	5,382	1,766	14.82	51	C	C
WG	Federal	Pollock (midwater)	51	C	C	C	53	C	C	C	58	116,530	17,439	1,747.46	66	124,994	14,334	1,521.59
		Pollock (midwater)	14	3,278	124	0.21	18	3,751	1,367	0.12	17	6,531	665	0.00	20	4,452	230	0.00
		Pollock (bottom)	10	1,183	21	0.02	22	8,178	12,348	0.69	19	3,364	973	3.05	20	2,989	1,066	1.00
		Pacific Cod	27	1,948	10	52.50	15	1,652	0	8.08	12	2,411	331	44.05	27	5,685	1	111.98
		Rockfish	13	8,059	107	37.07	11	6,959	292	35.94	11	4,923	225	22.11	15	5,336	385	34.32
		Arrowtooth Flounder	3	341	0	15.70	1	C	C	C	4	895	1	16.24	3	517	0	24.66
		Flathead Sole	1	C	C	C	3	365	144	14.32	2	C	C	C	1	C	C	C
		Rex Sole	2	C	C	C	2	C	C	C	1	C	C	C	1	C	C	C
		Shallow Water Flatfish	1	C	C	C												
	Federal Subtotal		45	15,435	262	124.65	42	21,333	14,992	68.80	36	18,418	2,210	101.72	46	19,113	1,734	178.33
	State	Pollock (midwater)	22	6,456	74	0.05	22	5,430	1,665	0.20	20	5,721	532	0.00	24	12,590	1,479	0.00
		Pollock (bottom)	14	3,500	228	0.13	25	11,063	17,677	2.11	22	5,571	1,746	4.02	24	8,394	5,179	0.96
		Pacific Cod	7	50	0	1.91	5	191	0	0.85	4	103	10	1.89	10	646		14.83
State Subtotal		24	10,006	302	2.09	26	16,684	19,342	3.16	22	11,395	2,289	5.91	27	21,630	6,658	15.79	
WG Total			45	25,441	564	126.74	42	38,017	34,334	71.96	36	29,813	4,499	107.63	46	40,743	8,392	194.12
Grand Total			143	104,802	8,262	1,848.03	143	147,021	56,479	1,643.43	132	150,823	22,082	1,862.37	146	169,800	22,915	1,718.93

Note: "C" denotes confidential data. AKFIN summary.

Table 2-9 reports quartile ranges for average annual vessel revenue in the GOA groundfish trawl fisheries, by sector and by management area. The data represents the lowest earning vessel up to the 25th percentile vessel, and the 75th percentile vessel up to the top earner. The data include annual revenue over the 2008 to 2011 period. The top earner or the vessel earning in the 25<sup>th</sup> percentile, for example, changed from year to year, so each reported figure represents multiple vessels. Said in another way, the dollar amount reported as the maximum for a given area and sector is the average revenue reported by the top earner in each year.

**Table 2-9 Average GOA trawl fleet revenue by quartile (2008 through 2011)**

		<b>WG</b>	<b>CG</b>	<b>WY</b>
CP	<b># Vessels</b>	16	13	4
	<b>Maximum</b>	\$1,580,000	\$2,960,000	*
	<b>75th Percentile</b>	\$1,080,000	\$5,560,000	*
	<b>25th Percentile</b>	\$380,000	\$770,000	*
	<b>Minimum</b>	\$130,000	\$70,000	*
CV	<b># Vessels</b>	38	60	24
	<b>Maximum</b>	\$920,000	\$2,020,000	\$230,000
	<b>75th Percentile</b>	\$450,000	\$1,180,000	\$80,000
	<b>25th Percentile</b>	\$120,000	\$240,000	\$50,000
	<b>Minimum</b>	\$10,000	\$4,000	\$10,000

Note: CP is based on first wholesale gross revenue; CV is based on ex-vessel gross revenue.

Finally, additional data are reported in the discussion paper on tender vessel deliveries (June 2013 Agenda Item C-5(c)). Those tables are not repeated in this section, but the reader may wish to refer to that section for breakouts of information by area 610, 620, and 630.

### 3 State Waters

As the Council develops alternatives to address GOA trawl bycatch management, the interrelationships between Guideline Harvest Level (GHL), parallel, and Federal fisheries management programs are important considerations. A federal management structure that allocates shares of a fishery to individuals, partnerships, corporate entities, cooperatives, or a regional fishing association, could change the incentives and opportunities to operate in state waters for the species covered under the program. Similar issues were a concern when the Council considered rationalization of the Gulf groundfish fisheries and some issues were not completely resolved. However, since the focus of the current bycatch management program is limited to the GOA trawl fisheries, the complexities associated with these issues are somewhat reduced. This paper is intended to outline the current management systems in state and federal waters. The paper also addresses federal management measures the Council could consider. Any management measures that apply to state waters would require the state to take action.

The Council is in the process of collecting background information and input from industry participants, but has not developed a refined list of potential management alternatives. This paper does not assume the proposed structure of a new program, but uses the example<sup>1</sup> of a person holding federal 'quota' as a means of explaining possible interactions between federal and state water fisheries. The structure of the program that is ultimately implemented will play an important role in how state and federal fisheries management interact. The two government entities operate under different laws and authorities. Management of Federal fisheries is governed primarily by the MSA and regulations implementing fishery management plans. Management of State fisheries is governed by the Constitution of the State of Alaska and the Alaska Administrative Code. As the Council considers the development of its proposed Trawl Bycatch Management Program, it must develop measures that meet federal management requirements and objectives. The State of Alaska, through the Board of Fisheries, must also determine what management measures are necessary<sup>2</sup>, if any, to meet their objectives for the management of trawl fisheries within their jurisdiction. Dialog between Federal and State fisheries managers during the development of a trawl bycatch management program for GOA trawl fisheries will be important to ensure both entities meet their management objectives/mandates, while effectively managing the fisheries under their control.

This paper will focus on the GOA Pacific cod and pollock fisheries because they are two of the primary fisheries prosecuted with trawl gear and that occur in both federal and state waters. However, to the extent that GOA trawl groundfish fisheries for other species occur in state waters, the concepts discussed in this paper would also apply. Two distinct management strategies are currently applied to Pacific cod and pollock fisheries occurring within state waters:

- Guideline Harvest Level (GHL) fisheries are managed exclusively by the Alaska Department of Fish and Game under policies developed by the Alaska Board of Fisheries. GHL fisheries are managed by the State setting an amount of harvest that is acceptable (the GHL) for a defined State waters area. In some fisheries the GHL is based on a percentage of the ABC, but other methods of determining the GHL could be used. The State also determines the legal gear types that may be used, the size of vessels that may be deployed in the fishery, and the fishing seasons. It then monitors the harvest in-season and closes the fishery when the GHL is

<sup>1</sup> As described in the Council's decision tree there are several types of quota share programs that could be implemented. The example used here does not presume any future action by the Council, but is presented as a means to describe potential relationships between state and federal fisheries.

<sup>2</sup> The State's equal access clause prohibits the implementation of a catch share program in state waters under these circumstances.

harvested. There are several GHL fisheries across the GOA for Pacific cod, and all exclude the use of trawl gear as a legal gear type. There is only one GHL pollock fishery, in the Prince William Sound Area, which allows the use of pelagic trawl gear. Estimates of removals in the GHL fisheries should be removed from the amount of a species that is available for harvest in an area, before the federal TAC is set.

- Parallel fisheries are those authorized by the State in State waters that largely utilize the fishing seasons, bycatch limits, area closures, and allowable gear types from Federal fishery management measures in adjacent waters of the EEZ. With the exception of State fisheries that have specified GHLs for species such as sablefish, Pacific cod, and the Prince William Sound pollock fishery, ADF&G coordinates their groundfish fishery openings and in-season adjustments with federal fisheries. For example, when groundfish fishing is open in federal waters, current state regulations allow fishing for pollock, Pacific cod, and Atka mackerel to occur in certain State waters in what is referred to as the “parallel” fishery (Title 05 Chapter 28.087 of the Alaska Administrative Code). The State defines the parallel fishery as the following: “For the purposes of this section, “parallel groundfish fisheries” means the Pacific cod, walleye pollock, and Atka mackerel fisheries in state waters opened by the commissioner, under emergency order authority, to correspond with the times, area, and unless otherwise specified, the gear of the federal season in adjacent federal waters. The annual TAC is not adjusted to accommodate fishing in State water parallel fisheries, because the State water harvest in the parallel fisheries is deducted from the federal TAC.

### **3.1 Description of GOA pollock and Pacific cod fisheries in state waters**

#### **3.1.1 Pollock**

*GHL Fishery.* The Prince William Sound (PWS) pollock fishery is managed using a harvest rate strategy, where the Guideline Harvest Level is the product of the biomass estimate, instantaneous natural mortality rate (0.3) and a precautionary factor of 0.7. Biomass is estimated by bottom trawl surveys in summer and hydroacoustic surveys in winter. In 1999, the Board of Fisheries directed the ADF&G to establish a Prince William Sound pollock trawl fishery management plan to reduce potential impacts on Steller sea lions by geographically apportioning the catch. Although pollock in the Gulf of Alaska are considered one stock, pollock in Prince William Sound appear not to be assessed by National Marine Fisheries Service surveys in the Gulf of Alaska. Therefore, ADF&G surveys of pollock in PWS are used to set the GHL, rather than setting the PWS pollock GHL as a fraction of the federal Total Allowable Catch for the Gulf of Alaska.

Vessels must be registered by January 13<sup>th</sup> to fish pollock during the noon January 20<sup>th</sup> through March 31<sup>st</sup> period in the PWS GHL pollock fishery. The fishery may be closed earlier, if the GHL is projected to be harvested, by emergency order. Registrations for this fishery will only be issued to individuals who possess a miscellaneous saltwater finfish permit card for trawl gear that is valid for that year.

The PWS Area is defined at 5 AAC 28.200 in State of Alaska regulations. All waters of PWS and waters of Alaska bounded on the west by the longitude of Cape Fairfield (148°50.25' W. long.) south to the latitude of Cape Douglas (58°51.10' N. lat.), then west to 149°00.00' W. long., then south along 149°00.00' W. long., and on the east by 144°00.00' W. long. define the PWS area.

The PWS Inside District includes all waters of PWS enclosed by lines from Pt. Whitt to Pt. Bentinck, Cape Hinchinbrook to Zaikof Pt., and Cape Cleare to Cape Puget. The PWS Outside

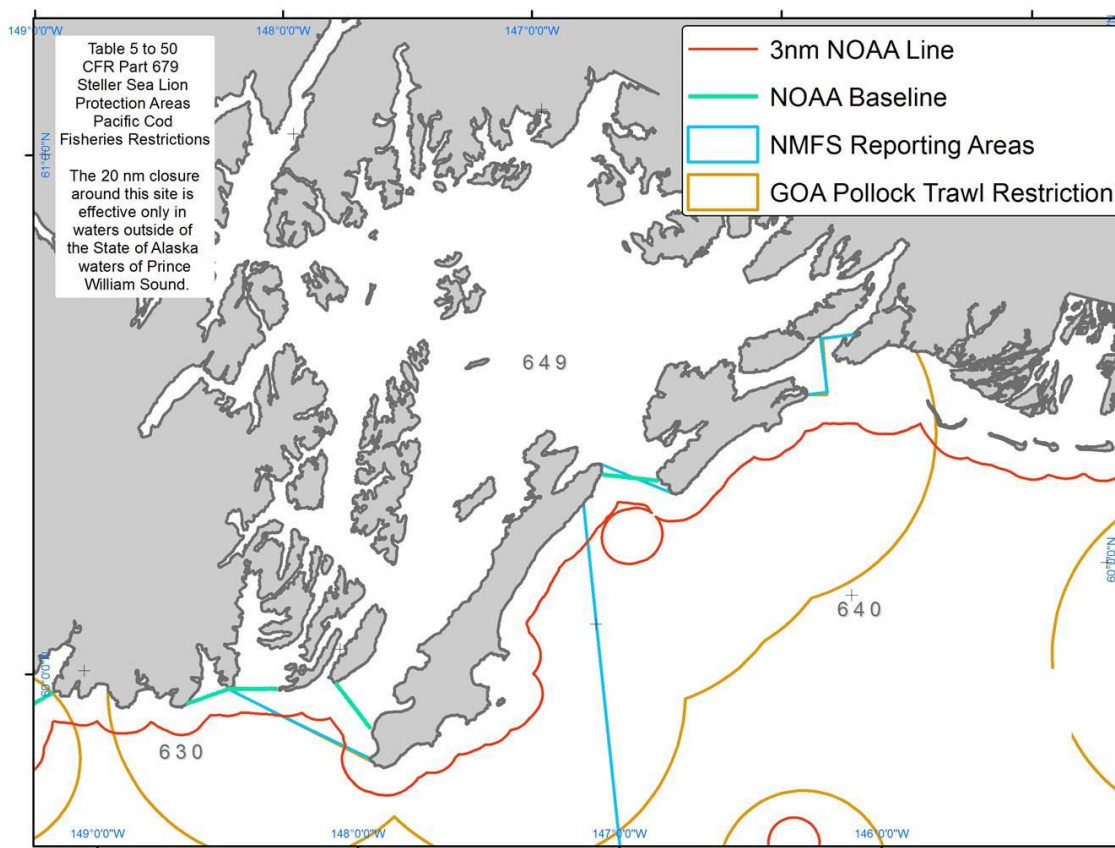


District is divided into two sections. The Eastern Section includes waters of the PWS Outside District between 147°00' W. long. and 144°00' W. long; the Western Section includes waters of the PWS Outside District west of 147°00' W. long. The PWS Pollock Pelagic Trawl Management Plan (5 AAC 28.263) divides the Inside District into the following three management sections:

- 1) Port Bainbridge Section: waters west of 148° W. long.
- 2) Knight Island Section: waters between 148° W. long. and 147° 20.00' W. long.
- 3) Hinchinbrook Section: waters east of 147° 20.00' W. long.

The management plan restricts the harvest from any one management section to no more than 40% of the GHL (5 AAC 28.263). Once the allowable harvest level within a section is attained, the directed trawl fishery within that section closes by emergency order for the remainder of the season.

PWS Inside District management area is not contained within a single federal area ([Figure 1](#)). The federal definition of the West Yakutat area is from 140° W. long. to 147° W. long. The Central GOA area covers the remainder of the PWS Inside District west of 147° W. long.



**Figure 1 Prince William Sound management area**

*Parallel Fisheries.* As currently defined, typically each year the Commissioner of the Alaska Department of Fish and Game opens and closes, by emergency order, a parallel season for pollock, to coincide with federal seasons in the Central Gulf of Alaska and Western Gulf of Alaska Areas. Parallel fisheries for pollock take place in state waters around Kodiak Island, in the Chignik Area, and along the South Alaska Peninsula. Currently, when NMFS issues a closure

notice for the Central/Western GOA trawl pollock or Pacific cod fisheries, a similar notice is issued by the Department of Fish and Game to close State waters, adjacent to the federal fishery, to directed fishing.

### **3.1.2 Pacific cod**

*GHL Fisheries.* All GHL fisheries for Pacific cod currently exclude trawl gear as a legal gear type. Because the Council is considering limiting its proposed action to the trawl sector, Pacific cod trawl fisheries impacts from the Federal trawl bycatch management program are not anticipated at this time. Persons that are issued trawl quota may also fish state waters using gear allowed within state waters. Also, the Council may consider allowing persons issued quota in the federal fisheries to fish their trawl allocations with other gear types that may have lower bycatch rates than trawl gear. If the trawl bycatch management program would allow this activity, the program may consider deducting fixed gear harvests from both state and federal waters from a person's trawl gear allocation. For example, the Federal program may allow persons issued Pacific cod trawl quota share to fish that allocation with hook-and-line or pot gear to reduce bycatch/PSC. It is assumed the catch would be deducted from the person's trawl apportionment, to maintain the allocations by gear type, but would provide the opportunity for additional harvest from State waters. Accounting for catch this way will require changes to the NMFS accounting system. Additional input from NMFS will be needed to determine if these change impose too great of a cost to warrant a change.

*Parallel Fisheries.* Typically, each year the Commissioner of the Alaska Department of Fish and Game opens and closes, by emergency order, a parallel season in the South Alaska Peninsula Area, Chignik Area, Kodiak Island Area, Cook Inlet Area, and the Prince William Sound Area, to coincide with the January 20<sup>th</sup> opening of the Central Gulf of Alaska Pacific cod trawl fisheries. While the parallel season is open, the same gear allowed in the federal Pacific cod fishery is permitted, unless use of that gear is explicitly prohibited by the state. Parallel fisheries for Pacific cod limit all vessels using trawl gear to a maximum of 58 feet in overall length for Chignik and the South Alaska Peninsula areas. Currently, when NMFS issues a closure notice for Pacific cod trawl fisheries in a federal area, a similar notice is issued by the Department of Fish and Game to close State waters, adjacent to the federal fishery, to directed fishing.

**Table 3-1 Amount (mt) and percent of pollock and Pacific cod harvested from State waters in the Western and Central GOA**

		Year			
Area	Waters	2009	2010	2011	2012
		Pollock			
CG	Federal	14,799	34,394	50,246	56,254
	State	8,594	10,908	5,341	12,667
CG Total		23,394	45,302	55,587	68,921
CG State % of Total		36.7%	24.1%	9.6%	18.4%
WG	Federal	4,461	11,929	9,894	7,441
	State	9,956	16,492	11,292	20,985
WG Total		14,417	28,421	21,186	28,425
WG State % of Total		69.1%	58.0%	53.3%	73.8%
		Pacific cod			
CG	Federal	5,881	14,688	10,916	12,521
CG Total		5,881	14,688	10,916	12,521
CG State % of Total		0.0%	0.0%	0.0%	0.0%
WG	Federal	1,948	1,652	2,411	5,685
	State	50	191	103	646
WG Total		1,998	1,844	2,514	6,331
WG State % of Total		2.5%	10.4%	4.1%	10.2%

Source: AKFIN summary of eLandings data

### 3.2 Conditions on Federal Permits

The Council and NMFS may include conditions on a Federal permit when those conditions are necessary to meet the objectives of the management program. These permit conditions may require the permit holder to comply with certain Federal requirements even when the permit holder is fishing outside of Federal waters. Two examples of federal permit requirements that have been extended to fishing outside the EEZ are:

- a. *Observer program* – persons that hold a Federal Fisheries Permit are required to abide by Federal observer program requirements when they are fishing in a parallel fishery (inside state-waters).
- b. *Logbooks* – Persons are required to complete and submit a federal logbook when fishing in a parallel fishery.

In developing the trawl bycatch management program, the Council and NMFS may determine that Federal permit holders would need to comply with certain Federal requirements when operating outside of Federal waters in order to adequately conserve and manage the Federal fishery. For example, if the Council were to develop a management program that issued harvest privileges to a person, the Council may determine that in order to adequately conserve and manage the Federal TAC, all catch of the allocated species in the area (and perhaps gear<sup>3</sup>) specified on the permit should be deducted from the person's federal allotment. In such a case, catch by the Federal permit holder in a Federal or a parallel fishery could be deducted from the permit. More thought is needed by staff and more direction is needed from the Council before we can provide additional discussion of deducting GHL catch from a Federal quota holder's permit. Currently the Federal Fisheries Permit application states that:

<sup>3</sup> The Council is still in the process of developing alternatives, so the discussion paper does not presume that harvest of trawl allocations by hook-and-line or pot gear would be prohibited.

*“...as a Federal Fisheries Permit holder fishing in State waters, you are responsible to know whether your catch is deducted from a Federal Total Allowable Catch (TAC) or from the State Guideline Harvest Level (GHL) and to comply with Federal fishery requirements when your groundfish catch will be deducted from the Federal TAC.”*

Deducting all of a person's landings (or catch) of species from their federal harvest privilege, regardless of whether they were harvested in State or Federal waters, could help prevent the person from circumventing the intent of federal regulations by increasing participation in state waters.<sup>4</sup> If a person with a federal allocation has not harvested their entire allotment for a species/area, NMFS could potentially deduct State water harvests from their federal allocation. Implementation of a Quota program may require measures that require persons to offload catch prior to entering a GHL fishery.

Unless these limitations on movement between fisheries are implemented, NMFS may not be able to determine whether a person has exceeded their quota. Limitations on movement would be necessary to prevent the scenario in which a permit holder takes a trip in a GHL fishery and meets or exceeds their quota during that trip but continues to fish in the parallel or Federal fishery during the same trip<sup>5</sup>. Without a requirement to offload their harvest prior to moving between state and federal fisheries, it would complicate enforcement being able to determine if a person has exceeded their quota. Only after those landings are deducted from their federal quota holding (or deducted from the GHL) would the person be allowed to continue fishing.

In general, the above discussion means that any person holding a federal harvest privilege **could** be required to stop fishing in a federal or parallel fishery when their federal allocation for that fishery is taken, if the Council patterns this program after the IFQ program to meet their objectives. State of Alaska regulations will determine whether that person is permitted to continue fishing in GHL fisheries.

The ability of a permit holder to surrender their FFP in order to gain additional access to state water fisheries may be a concern in the development of a trawl bycatch management program. If the Council would determine that the ability to surrender a permit poses conservation and management concerns for the Federal fishery, the Council may wish to review policies that determine how often a person may surrender and then reacquire or modify a federal fisheries permit. Given current regulations, modifications may be unnecessary. Federal Regulations at 50 CFR 679.4 limit the amendment or re-issuance of Federal Fisheries Permits during the three-year permit cycle that have specific endorsements. Federal Fisheries Permits (FFP) may be voluntarily surrendered in accordance with 50 CFR 679.4(a)(9) or amended under 50 CFR 679.4(b)(4), except as specifically prohibited at 50 CFR 679.4(b)(4)(ii) and (iii). Those sections state that if an FFP is endorsed for the GOA and CP and/or CV Operation and trawl, pot, hook-and-line, or jig gear, once surrendered the permit cannot be re-issued until after the expiration date on the surrendered permit. Additionally, an FFP cannot be amended to remove the GOA, CP, CV, trawl gear, pot gear, hook-and-line gear, or jig gear endorsement.

NMFS will need to account for the anticipated state waters removals that are not deducted from any quota holder's permit, before the amount of fish allocated to quota holders is determined. This may include both target species and PSC. For example, the amount of a species (target and

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<sup>4</sup> If a person's initial allocation was based on harvest from both State and Federal waters, it may be considered appropriate to deduct catch (landings) from their allocation in both areas as well. However, the Council has not stated its intent. Only after it provides language regarding intent and how this action would address its intent can staff provide a discussion of how this action is necessary and appropriate for the conservation and management of the Federal fishery.

<sup>5</sup> Assuming GHL harvests are deducted from a quota holder's account.

PSC) allocated under the federal program would be reduced by the amount assumed to be harvested in GHF fisheries by persons not holding federal quota or persons that have used their quota holdings. Therefore, the State and NMFS may wish to coordinate the time line for setting GHFs and the federal quota amounts, to provide adequate time to allocate quotas. In terms of PSC allocations, the Chinook salmon PSC allotment for the pelagic trawl pollock fishery would be reduced by the amount of Chinook taken in the PWS fishery and any new GHF fisheries implemented. For Pacific cod fisheries, the halibut PSC limit for the shallow-water complex (as currently specified) could be reduced by any amount of halibut PSC used in GHF fisheries that may be implemented.

### **3.3 State Fishery Management Options**

If the Council develops a program that anticipates complementary action by the State in state waters, complementary measures would need to be approved by the Board of Fisheries and developed in consultation with ADF&G. Because the percentage of removals of pollock and Pacific cod from State waters in the Western and Central GOA, using trawl gear, are substantially different, the State may develop a different management approach for each fishery. Pacific cod harvest from State waters with trawl gear in the parallel fishery are limited, so a straightforward option for the State may be to close state waters to trawling for Pacific cod. As shown in Table 3-1, ten percent or less of the total Pacific cod fishery is harvested from State waters in the Western GOA and none (or almost none) is harvested from the Central GOA. Because greater percentage of the pollock fishery is harvested with trawl gear from State waters, a different management strategy may be more suitable than closing state waters. The next sections describe issues and options for both parallel and GHF fisheries management measures that could be applied to the pollock fishery (and Pacific cod fishery) if that were the desire of the State and Council.

*Parallel Fisheries.* If the Council moves forward with a management structure that allocates shares of a fishery to individuals, partnerships, corporate entities, cooperatives, or a community fishing association, the fundamental structure for parallel fisheries may need to be altered. The State will need to consider whether parallel fishery management continues to meet State management objectives and if not, what changes might be needed. The Council will need to consider whether the program risks exceeding the ABC/TAC, affects the ability to achieve optimum yield, or allows too much fish to be harvested from a specific area.

The primary issue for parallel fisheries is that fishing under individual allocations results in a fishery “closing” at different times for each person. This structure makes closing a parallel fishery for the entire sector at a specific time more challenging for the state and perhaps unworkable, unless the closure is based on removals from State waters. The State of Alaska setting a harvest limit for State waters is more like a GHF management structure than a parallel fisheries management structure.

If the quota program prohibits permit holders from fishing in management areas when the holder’s quota is fully harvested, the State may want to implement complementary action to prohibit fishing in State waters. However such an action may lead to persons being granted different access to State waters, which may conflict with the Alaska Constitution that indicates “wherever occurring in their natural state, fish, wildlife, and waters are reserved to the people for common use.” That section of the Alaska Constitution, at Article VIII, Section 3, indicates that natural resources must be managed by the state as a public trust for the benefit of the people as a whole, rather than for the benefit of the government, corporations, or private persons. The Alaska Constitution, at Article VIII, Section 15 states that “no exclusive right or special privilege of

fishery shall be created or authorized in the natural waters of the State. This section does not restrict the power of the State to limit entry into any fishery for purposes of resource conservation, to prevent economic distress among fishermen and those dependent upon them for a livelihood and to promote the efficient development of aquaculture in the State.” The State of Alaska would have to determine whether it could limit access to a GHL fishery only.

Given management issues associated with parallel fisheries, when there is a federal allocation to individuals, the Council may consider consulting with the State on whether they feel that parallel fisheries, in these instances, meet their management objectives. If parallel fisheries are viewed as a viable management tool by the State of Alaska, the Council may consider requiring a person to stop fishing for the permitted species in federal (or state) waters when they have harvested their allocation from either state or federal waters (like is done in the IFQ program). Persons without a federal fishing permit or LLP could be allowed to continue fishing until the State closes their waters.

However, NMFS will need to allocate Federal privileges at the beginning of each year based on a given amount of TAC, which means deducting the amount of harvest that is not attributed to Federal permits/privileges. **Because of the uncertainty of the amount of harvest that would be taken by vessels that do not hold a federal permit in the parallel fisheries, NMFS and the Council would need to conservatively account for those removals during the harvest specifications process.** Depending on how close the projected harvest is to the actual harvest by those vessels, it could cause concern that the ABC/TAC would be exceeded. Because it is assumed the State would close their waters to directed fishing when a set amount of a species is taken, their management structure actually becomes more like a GHL fishery.

*GHL Fisheries.* The State of Alaska has management authority over all aspects of GHL fisheries, including the amount of a species that may be harvested, gear types, vessel size, opening and closing dates, and the maximum amount that may be harvested per trip. The Council would need to consult with the Board of Fisheries if the program under development is expected to result in the need for complementary Board action. This paper considers two ways to address state waters removals from the TAC using the existing GHL system. Under both actions state waters harvest would be deducted from the federal quota holder’s allocation. Therefore, this discussion is provided to the Council so they may consider how NMFS would need to account removals from state waters when setting the TAC.

Under the first option, the State would only deduct harvests by persons that do not hold Federal quota from the GHL amount<sup>6</sup>. Any person that held Federal quota would have their harvest deducted from their quota account and would be required to stop fishing (at least in Federal waters) when their allocation is harvested.

- Fish harvested from State waters by a person that does not hold federal quota for that fishery is reported through the eLandings system and deducted from the GHL. Any person fishing in the GHL fishery must hold all State required permits;
- Fish harvested from State waters by a federal quota holder with quota available would be reported to NMFS through the eLandings or another quota reporting system to RAM and would be deducted from the quota holder’s account, but not the GHL;
- Fish harvested from state waters by a federal quota holder without quota available would be reported through eLandings and deducted from the GHL;

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<sup>6</sup> This discussion is intended to show how accounting for removals from State waters impacts how NMFS must account for those removals before quota is allocated under the Federal program.

- State waters would be closed to all participants in that fishery when the GHL limit has been harvested. This applies to both persons with Federal quota available and GHL fishery participants;
- Persons that were permitted to fish in State waters and have available federal quota after State waters are closed, would be required to harvest any remaining quota in the EEZ, if they wish to continue fishing.

Under this accounting system<sup>7</sup>, the amount taken from state waters is equal to the GHL plus the amount of Federal quota allocations that are fished in state waters prior to their closing; thus, there is no set limit on the amount taken from state waters annually. At the start of the fishing year NMFS would know that the GHL plus any quota taken from state waters before the area is closed is the maximum amount that could be taken from state waters. Not knowing the amount of a species that would be taken annually from state waters, is not expected to cause biological concerns, since that is currently what happens in the fishery. Both State and Federal waters are closed when the TAC is harvested and the amount that is taken from state waters is not known at the beginning of the year. Because it was not necessary to limit removals from State-waters in the past, it may not be necessary if the management structure is modified. This issue could merit further examination to address any biological concerns may arise. The magnitude of the issue may also be dependent on the size of the GHL. A relatively small GHL would likely mitigate opportunities to increase harvests from State-waters. NMFS would also need to consider, when setting the TAC, the potential for persons with a Federal permit harvesting from State waters. If too much harvest is projected to occur by federal permit holders, permit limitation may be used to restrict their participation in those areas. However, procedural due process may be necessary if permits are modified. That may prevent modifying permits in a timely way.

A second accounting model would deduct state water harvests by both persons holding a Federal permit/privilege, and those that do not, from the amount set by the state as a GHL.

- Fish harvested from State waters and subject to the GHL limit by any person not holding a Federal permit to harvest a specific amount of quota, is reported through the eLandings system and deducted from the GHL. Any person fishing in the GHL fishery must hold all State required permits;
- Fish harvested from State waters by a federal quota holder would be reported to NMFS through the eLandings or another quota reporting system to RAM and would be deducted from the quota holder's account **and the GHL**;
- State waters would be closed to all participants in that fishery when the GHL limit has been harvested. This applies to both persons with Federal quota available and GHL fishery participants;
- Persons that were permitted to fish in State waters and have available federal quota after State waters are closed, would be required to harvest any remaining quota in the EEZ, if they wish to continue fishing.

The closure notice would apply to all State waters harvest in that fishery, regardless of whether a person held Federal quota or not. So, if the entire GHL were taken by Federal permit holders, persons without a Federal permit would not benefit from the GHL. This is unlikely to occur, if others have participated in the past, because it would continue to be a race to harvest the amount of fish available in State waters. The race would likely have the greatest impact on persons

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<sup>7</sup> This accounting system has not been approved by NMFS catch accounting, if this program structure is moved forward, it would need to determine whether it could be implemented within their time and budget constraints.

without a Federal permit, because they would not be given the opportunity to continue fishing in Federal waters.

Persons that hold Federal quota may be motivated to fish in State waters if they feel there are economic benefits, in terms of reduced costs to do so. If the amount of quota available to persons in the Federal programs is set using the formula:

$$\text{Quota} = \text{TAC} - \text{GHL}$$

Federal permit holders may feel that reducing harvests of persons that do not hold a federal permit, by focusing their effort in State-waters, will reduce the GHL deduction from the available TAC and lead to larger allocations in the future. The ability to engage in this behavior is dependent on the limitations imposed on GHL participants by the State (e.g., vessel length restrictions or trip limits) and historic participation patterns in State waters by Federal quota holders. A Federal quota holder could not increase participation in State waters if they had fished State waters exclusively in the past, without acquiring additional quota.



## **4 Promoting Community Stability**

The Council requested additional information that considers potential management methods that might be viable options under the trawl bycatch management program to meet their goals and objectives to promote stability for communities that are dependent on GOA fisheries. In response to that request, this paper considers the broad concepts of fishing communities, regional fishing associations, community fishing associations, port of landing requirement, and regionalization. The discussion will focus on basic constructs of the programs, the Council's authority to include options that fall under these broad headings, and the program's potential ability to meet the goals and objectives of the Council.

Many of the goals and objectives identified by the Council apply indirectly to communities. However, this discussion paper will focus on meeting the intent of two items in the Council's list of goals and objectives.

4. Authorize fair and equitable access privileges that take into consideration the value of assets and investments in the fishery and dependency on the fishery for harvesters, processors, and communities
6. Promote community stability and minimize adverse economic impacts by limiting consolidation, providing employment and entry opportunities, and increasing the economic viability of the groundfish harvesters, processors, and support industries

### **4.1 Authority**

The Revised Magnuson Stevens Act of 2006 (MSA) provides the Council authority relative to Fishing Communities and Regional Fishing Association. The Council may also consider limited access privilege program. Eligibility requirements in the MSA are specific in terms of the communities that may be considered, the responsibilities of the Council/NMFS, and the responsibilities of communities that receive an allocation. The MSA also describes eligibility and establishing criteria for regional fishing associations.

#### **4.1.1 Fishing Communities and Regional Fishing Associations**

Sections of the MSA that define the eligibility requirements for fishing communities and regional fishing associations to participate in a LAPP are provided in Table 2. Section 303A(3) defines the requirements for fishing community participation in limited access systems. Section 303A(4) defined the eligibility requirements for a regional fishing association to participate in a limited access system.

**Table 2. Requirements of the MSA with respect to eligibility and CFAs and Regional Fishing Associations (RFA).**

<i>Eligibility Requirement</i>	<i>303A Reference</i>	
<i>A fishing community/RFA shall:</i>	<i>Fishing Communities</i>	<i>RFA</i>
Be located within the NPFMC management area <sup>8</sup>	(3)(A)(i)(I)	(4)(A)(i)
Meet other NPFMC criteria	(3)(A)(i)(II)	(4)(A)(ii)
Be a voluntary association with bylaws and operating procedures		(4)(A)(iii)
Consist of harvesters, processors, support businesses and communities	Residents within the area: (3)(A)(i)(III)	Those who hold QS: (4)(A)(iv)
Not be eligible to receive QS		(4)(A)(v)
Provide a plan	(3)(A)(i)(IV)	(4)(A)(iv)

Table 3 provides an overview of MSA participation considerations for fishing communities and RFAs. These are aspects of the program that the Council is required to consider. The MSA does not prescribe a specific action that must be taken after the criteria are considered.

**Table 3 Requirements of the MSA with respect to factors the Council is required to consider in establishing criteria for Fishing Communities and RFAs.**

<i>Participation Criteria</i>	<i>303A Reference</i>	
<i>The Council shall consider:</i>	<i>Fishing Communities</i>	<i>RFA</i>
traditional fishing or processing practices in and dependence on the fishery	(3)(B)(i)	(4)(B)(i)
the cultural and social framework	(3)(B)(ii)	(4)(B)(ii)
economic barriers to access the fishery	(3)(B)(iii)	(4)(B)(iii)
existence and severity of projected impacts	(3)(B)(iv)	(4)(B)(iv)
administrative and fiduciary soundness of the association		(4)(A)(v)
effectiveness, transparency and equitability of the community sustainability plan	(3)(B)(v)	(4)(A)(vi)
Potential for helping remote communities lacking resources	(3)(B)(vi)	

#### **4.1.2 Community Fishing Associations**

The Council could also develop a third type of community fishing association (CFA) that meets the MSA requirements while more closely focusing on the Council's goals and objectives (PFMC). The third type of CFA must still be a legal entity, meet a geographic designation requirement, meet membership requirements, have community support, meet operational standards, and must develop an adequate Community Sustainability Plan.

<sup>8</sup> The NPFMC management area is defined in the MSA 302(a)(1)(G) as fisheries in the Arctic Ocean, Bering Sea, and Pacific Ocean seaward of Alaska.

## 4.2 CFA Structures

This type of association could be structured such that:

- QS holders form a “loose knit” or informal organization to engage in risk pooling, cost reduction (monitoring program cost sharing), trading bycatch, and sharing information. The organization is formed recognizing that heightened cooperation is required to adapt to the Council’s bycatch management plan. QS holders retain ownership of their own QS. An association is formed, with each fishermen serving as a Board Member. A written agreement governs the relationship.
- A more formal arrangement where the organization (CFA) formally holds the fishermen’s quota. The QS holders become “shareholders” in a CFA that holds the quota. This scenario may apply if the above scenario is too informal to be effective; a more formal structure with broader ability to direct harvest activities is required to achieve. The CFA may acquire additional quota encourage additional participation (new members). This structure is closer to the cooperatives that currently exist in Alaska fisheries.

Under either of the first two structures a processor could work with associated vessels to provide coordination functions for vessels. However, the Council does not have authority under the MSA to require that CFAs are linked to a specific processor.

- An independent, newly created third party entity forms to acquire and hold QS (could be through initial allocation or purchase of QS), and tie it to a particular place for the benefit of community members. This program would be most controversial if an initial allocation of quota was made to the CFA or those stakeholders that are eligible to purchase QS are concerned that the CFA would have an economic advantage.

Based on the report to the Pacific Fishery Management Council (PFMC), CFA’s should not overlap geographically. They can be composed of one or more community with or without a geographic restriction. The author felt it was important to have one CFA representing a community/geographic area, so that the goals and objectives of two CFAs would not conflict.

CFAs should be required to demonstrate support from local governments, harvesters, processors, and other affected support businesses. This appears to be a critical aspect of any CFA. If the entities that rely on decisions of the CFA support its formation and operation, the program has a greater chance of being successful and the members are more likely to have a unified set of goals and objectives. Those goals and objectives should ensure that all sectors benefit (or harm is minimized) from the structure of the CFA.

Every CFA is required to develop and abide by an adequate Community Stability Plan. That plan should include CFA goals and objectives, a means to achieve the specified goals and objectives, and performance measures that allows the Council and NMFS to judge the effectiveness of the CFA’s Community Stability Plan. The Community Stability Plan’s goals and objectives should allow the Council and the SOC to determine whether CFA formation is warranted. Plans that do not meet that threshold could be rejected by the Council or returned to the submitter for revisions. The plan should also provide sufficient information to allow the Council to determine the effectiveness of the CFA after the program is implemented.

The Crab Rationalization Program designated “eligible” communities as those with three percent or more of the qualified historic landings in any Program crab fishery. The eligible crab communities enjoy community protection measures, such as the two-year “Cooling Off” provision, the “Right of First Refusal (ROFR), sea time waivers, and other community provisions.

There are several ways a CFA could be structured. Primary decision points include:

- the entities included in the program,
- how the CFA gains access to QS,
- how the CFA is governed,
- the CFA activities that help it fulfill its mandate
- NPMFC’s role in developing the CFA (specifically exemptions to general program rules) and implementing reporting requirements to monitor its progress.

The Pacific Fishery Management Council (PFMC) scoped possible provisions for CFAs under Amendment 20 (PFMC). They determined that entities are able to form community associations for a variety of purposes without Council action. For the PFMC the main issues were (1) should any special privileges be provided to such entities, and, if so, (2) what are the criteria such an entity would have to meet in order to qualify as one deserving of such privileges? The primary focus of the special privileges was a more liberal ownership/control rules for CFAs. Supporters of CFAs felt that it would be impossible to develop an effective CFA without more liberal rules to hold and use QS. The PFMC was concerned that more liberal QS caps for CFAs could create a loop-hole that could be exploited in ways that were unintended. Ultimately, the PFMC determined that more liberal caps would not be included in their program for CFAs.

#### 4.2.1 Potential Benefits of a CFA

CFA could provide greater community stability, by linking quota to a defined geographic location. Quota migration out of small communities could be limited or prevented. This has been an issue in the past. For example, in April, 2002 the Council passed a final motion recommending revisions to the existing Halibut/Sablefish IFQ program to explicitly allow a new group of non-profit entities to hold halibut and sablefish QS on behalf of residents of specific rural communities located adjacent to the Gulf of Alaska. The intent of that program is to reverse the out-migration of IFQ quota share from rural, Gulf of Alaska coastal communities. A properly structured CFA could provide similar benefits to communities.

Development of a community plan would provide each CFA the opportunity to clearly state how it feels it would be affected by the proposed program. It would also allow the CFA to describe how proposed measures to mitigate adverse impacts of the quota program would work. Periodic review would ensure those objectives are being achieved.

CFAs may provide a method to smooth transitional impacts of a quota program and provide a structure that allows the community more input in how local fishery functions. If the structure is accepted by all stakeholders it could result in a productive relationship among harvesters, and between harvesters and processors.

A CFA would help maintain the health of fishing communities, with QS “anchored” in communities assisting small family operations, local processing, and new entrants. The program could also benefit historic participants that want to remain in the local community.

The CFA could foster a diverse fleet including small and large-scale operations, and a mix of trawling and other gear types. The CFA could expand into other fisheries if the program was structured to allow those activities. For example, they could potentially have members that participate in the IFQ and/or rockfish program, so that fishing plans within the community were more fully integrated.

#### 4.2.2 Potential Detriments of a CFA

The structure of the program will in large part determine acceptance of a community fishing association. CFAs that receive an initial allocation and control over how that allocation is used are likely to be controversial. Harvesters (processors) would lose direct control over some percentage of harvest shares. That would increase harvester's uncertainty regarding the amount of quota that would be available to each individual on an annual basis. However, that type of allocation would give the community the greatest power at the least expense. CFAs that are structured so that QS holders supply the quota within a CFA or the quota is purchased by the CFA, would shift power from the community association to individuals that hold quota. The amount of power held by QS holders would depend on the freedom they have to leave a CFA. Depending on the composition of the board that oversees the distribution of quota held by the CFA harvesters will be concerned that the decisions of the CFA could be driven by dominating individuals/organizations who co-opt the CFA for their own purposes.

Many practicalities and complexities would need to be worked out in terms of how to acquire quota, membership, rights/obligations of members, budgeting/funding, and governance. These issues would need to be clearly articulated in the CFA plan and have the broad support of the affected stakeholders.

Developing a clearly articulated statement of how the Council's goals are met is required for this model. Development of those goals is dependent on the overall structure of the Council's program. Therefore the timing of when those plans would need to be approved could impact the timing of the overall groundfish bycatch management program.

A CFA could serve as a loop-hole to avoid control limits, if the CFA limits are greater than individual ownership/control limits. The Council will need to develop regulations and CFA oversight that would ensure CFA limits do not undermine the intent of the Council's overall program.

Oversight of the program could occupy a disproportionate amount of Council and management time (i.e., special monitoring, tracking, workload dealing with applications). These increased costs would be passed on to all quota holders through a cost recovery program that is required under LAP programs.

A CFA could lead to inter-community rivalries as communities acquire quota. If quota is acquired by a CFA that was previously being delivered to another community, it could create tensions and lead to increased efforts to for the community that lost the landings to replace them by purchasing other shares. Increased demand for shares could raise prices for all participants.

A CFA should be required to provide fair opportunity for access to eligible entities. Depending on the structure of the CFA and the composition of the directors, some persons within the community could be given preferential treatment by the CFA. Others may have access to quota limited because of relationships with persons who determine how quota held by the CFA will be used.

## **CFA Conclusions**

Recently, community-based fisheries management has attracted considerable interest; the U.S. Government Accountability Office (GAO) found that “the easiest and most direct way to help protect communities under a quota program is to allow the communities themselves to hold quota.” (U.S. Government Accountability Office). In CFA programs, communities play a large role in managing their fisheries and protecting the resource. Each type of catch share program has its strengths and weaknesses, and the diversity of U.S. fisheries and fishing communities necessitates a variety of approaches. Because each fishery is unique, catch share programs must be tailored to its needs and challenges and the communities that depend on it (Group).

For CFAs to be successful they will require broad support of stakeholders in the effected community or region. Broad support is achieved by sufficiently addressing the primary concerns of each stakeholder group, which could extend beyond the entities directly reliant on the trawl fisheries in communities that have a broad base of fisheries. Identifying specific concerns that need to be addressed are dependent on the structure of the trawl bycatch management program. Until the Council has better defined the overall program, it is difficult for communities to develop a community plan.

The CFA board’s ability to foster trust and create realistic expectations for the program is critical, both in the near term and the long term. If the CFA is not accepted by a broad base within the community, it could be divisive.

Balancing expectations will be difficult unless CFAs focus on big picture issues at the community level. Those issues could include promoting the community through the effective use of a CFA to maintain landings in a community and provide access to the resource. Acting as a center for organizing a community’s fishing operations by promoting cooperative, mutually beneficial relationships among fishery participants in a community.

## Regionalization

The Council may wish to consider requiring that a percentage of the harvests TAC species, taken from a management area, be delivered to a specified geographic region. This approach was taken in the Crab Rationalization program where the regional delivery requirements for QS and PQS were implemented to help preserve the historic geographic distribution of landings and resultant fishery revenues in fishery-dependent economies. Two regional designations (Northern and Southern) were created in most Crab Rationalization Program fisheries. Depending on the areas and species included in the Trawl Bycatch Management Program, the Council could consider requiring a defined percentage of species that are caught from the Central GOA management area be landed in a community adjacent to Central GOA waters (i.e., Kodiak). Corresponding requirements could also be defined for percentages the Western GOA TACs. Given the distribution of plants that process groundfish from the Western GOA, regionalization may be of limited effectiveness for communities and the associated processors, unless the regions were of limited size, which results in other issues of linking a harvester to a processor. Strong linkages, like landings requirements in ports with one processor, exceed the Council's authority granted under the MSA.

When the Council considered GOA management measures (December 10, 2004 motion) it developed specific regionalization alternatives. Regionalization at that time considered categorizing processor licenses by region. Currently the Council does not have the authority to develop a limited license program for processors and then classifying those licenses by region.

Catcher vessel harvest shares would have been regionalized based on where their qualifying catch was processed, not where it was caught. Harvest shares would be regionalized based on the landings history during the regionalization qualifying period. Catcher processor shares and any incentive fisheries developed would not have been subject to regionalization.

Under that action the Council proposed establishing regions by fisheries that would be subject to regionalization. Two regions were proposed to classify harvesting shares in the Central GOA. They were divided by a North - South line at 58 51.10' North Latitude (Cape Douglas corner for Cook Inlet bottom trawl ban area) extending west to east to the intersection with 140° W long, and then southerly along 140° W long.). The following fisheries were proposed to be regionalized for shorebased (including floating) catch and subject to the North-South distribution: Central GOA Pollock (area 620 and 630) CGOA aggregate flatfish, Central GOA aggregate rockfish and Central GOA Pacific cod. Central GOA trawl sablefish will be regionalized based on all landing of primary species in the Central GOA associated with the license during regionalization qualifying period.

The utility of implementing regionalization requirements depends on the type of management program developed by the Council. Regionalization requirements have typically been implemented as an element of quota programs that allocated target species to persons with long term duration. If the Council moved forward with implementing a program that allocates fixed-term quota or only issued PSC quota, the impacts and structure of the program could differ.

For example, if the Council developed a program that only allocated halibut PSC and Chinook salmon PSC to individuals, the Council would not know how much of a target species would be taken by persons that typically deliver to each region. This could result in persons that have historically delivered their catch to one area being required to deliver to another, as a result of their prudent PSC usage. Allocation of target species or a subset of target species would reduce these uncertainties, especially if the harvest shares were issued with regional designations.

The effectiveness of regionalization also depends on the historic landings patterns within to community relative to how they could change under a catch share plan. Given the structure of the GOA groundfish fishery, it is assumed that C/P harvests would not be regionalized. Catcher vessel harvests would be regionalized based on historic averages. This type of program is likely to be more successful, at a community level, for Kodiak than it is in the Western GOA. If a specific percentage of CV harvests from areas 620 and 630 must be landed at communities adjacent to the Central Region it currently means that the fish would primarily be landed in Kodiak. Unless processors in other communities begin processing groundfish, it would guarantee a level of economic activity within Kodiak. However, since there are several processors (between seven and nine depending on the year) competing for those fish, the processor protections are limited. Harvesters would still have the opportunity to determine which processor within the regions is offering the most value for their fish, and have the right to deliver to that processor. Regionalization in that case would benefit the community of Kodiak, but only provide limited benefits to individual processors.

In the Western GOA, even the community protections are limited<sup>9</sup>. Fish are traditionally delivered to King Cove (one plant), Sand Point (one plant), Dutch Harbor (one plant, but the potential for increase), and Akutan (one plant). Therefore, the communities are competing for access to the fish in a region. A broad regional definition would provide little protection (for processors or communities) relative to not having regionalization. Especially since the local fleets are more likely to continue delivering to the processor within their community.

Another area of concern for the Western GOA region is the processing capacity that exists. Dutch Harbor/Unalaska annual leads the Nation in terms of pounds of fish processed. Recently, only one processor has taken deliveries of Western GOA groundfish. If a catch share program created an incentive to alter delivery patterns, the communities in the region have the processing capacity to increase the amount of Western GOA groundfish they process. Therefore, regionalization may not provide benefits to communities or processors in the Western GOA, because of the locations and capacity of processors in that area.

#### **4.3 Port of Landings Requirements**

Port of landings requirements may be an effective tool for protecting a community, but it may create a requirement that some harvesters deliver to a specific processor. Creating that requirement exceeds the Council's authority under the MSA. Therefore, port of landings requirements may be effective and implementable in Kodiak. In that case they could provide additional protection for the community relative to a regional landing requirement, because they would not need to compete with other communities in the region that have, or could develop, groundfish processing capacity.

In the Western GOA, the port of landing requirement would require additional authority from Congress to implement. If that authority was granted it would provide greater protections for the communities and the local processor. However, catcher vessels that are required to deliver to a processor would lose market power, which could be reflected in the ex-vessel value they receive for deliveries. Since the Council currently lacks the authority to implement this requirement for most of the affected ports in the Western GOA, the provision is not discussion further.

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<sup>9</sup> This of course depends on the regions defined by the Council.



## 5 Limited Duration Quota

The Council requested additional information on the benefits and detriments of limited duration allocations. It also requested that the discussion include the identification of possible bycatch performance incentives upon which to base ongoing quota allocations and provide a discussion of non-monetary auction options.

Anderson (2007) states that the term “duration” refers to the lifetime of a privilege or share itself, not its possession by an entity. Possession of shares is governed by initial and subsequent eligibility requirements, transfer provisions, and other applicable rules. The MSA is very clear about most aspects of duration; LAPs may be revoked or limited in accordance with the MSA, they do not confer rights of compensation, and they do not create any ownership of a fish before it is harvested [Section 303A(b)].

Anderson (2007) also stated that because “*the language is somewhat obscure, the revised MSA effectively mandates that duration of LAPs be equal to the actual life of the plan [Section 303A(f)]*.” He reasoned that unless the Council takes action the permit will be renewed before the end of the period (maximum of 10 years) for which they are issued, unless they have been revoked for cause. That is, the current owner of a privilege is entitled to have the permit renewed unless he or she fails to comply with the requirements of the plan or commits an act that is prohibited by the MSA in general. He did note, however, that Councils have the option of creating their own conditions for duration and renewal of quota. He then stated that the conditions should be well defined, easily monitored, and subject to clear-cut determinations of compliance. Should the Council develop an allocation system that limits duration based on some performance criteria, it should meet those conditions to the extent possible.

Globally there is no consistent pattern to the duration of fisheries privileges. They range from annual to perpetual. For example, in New Zealand privileges are held in perpetuity (Harte, et al. 2008) while in the Falkland Islands privileges are held for 25 years (Harte and Barton 2007). In Canada, privileges are granted “annually” while in Australia they vary from fishery to fishery depending on the duration of the management plan (Arnason 2001).

With few exceptions (notably several fisheries in Chile) privileges have what Anderson (2007) calls rolling conditional permanence. For example, in both the Canadian and Australian situation the continual renewal of short-term privileges has resulted in the expectations by holders and management agencies that the privileges are a form of rolling conditional privileges. Holders of such privileges have a legal or procedural expectation based on precedence that their basic privilege to access a fishery will be renewed before or when it expires. As noted earlier it is the certainty associated with the management of the fishery that matters as much as the statutory duration of the privilege when it comes to the perception of its value by the asset owner and the broader marketplace.

The Council’s action on the Rockfish Program noticed the industry that quota would not be renewed unless the Council took additional action, as opposed to requiring the Council to take action to revoke the permit. While the Council retains the option to reissue rockfish program quota to the same persons and in the same amounts, it also wanted to ensure persons did not assume that the quota being issued was a “permanent allocation”. Based on the rockfish program allocation and the halibut/sablefish IFQ programs, the Council has demonstrated its authority to develop both limited duration and perpetual duration quota programs. Those programs highlight that quota allocations may take on a variety of forms and durations that are dependent on the Council’s objectives for that fishery.

## **5.1 Perceived durability of the program**

Another aspect of duration that is important to consider is stakeholder expectations of the program. The durability of the privilege depends on both the length of time it is issued and the privilege holder's perceptions of a program's management. For example, a fixed-term privilege granted for a short period but with a strong presumption of renewal may be just as durable and will confer the same or greater economic benefits than a privilege granted for 20 years but carries with it an expectation that the government will fundamentally change aspects of the management program within that period.

## **5.2 Benefits and detriments of limited duration programs**

The Pacific Council has recently addressed the issue of fixed-term allocations (auctions) relative to long-term allocations. The findings of their SSC (PFMC) and NMFS indicate that the choice of a harvest privilege's duration can impact the flexibility that managers have in addressing policy goals in the future, the level of transaction costs for the managed sector, and the incentives that resource users face for investment in, and conservation of public resources. Each of these issues is addressed in the following sections, drawing heavily on the findings of the Pacific Council and other published papers.

### **5.2.1 Benefits of Limited Duration Programs**

#### **5.2.1.1 Fixed-term allocations reduce the need to identify all problem areas at the program's outset**

Fixed-term privileges would not require the Council to specify each problem area in advance, as it develops a catch share program. Councils have the authority to set rules in the plan to limit or forbid certain actions that it believes will lead to unsatisfactory outcomes. These rules must be defined before the plan is implemented, and the uncertainty of their effectiveness is a concern. It is not always possible to project specific outcomes given limits on information that is available during the design and implementation phases of the program. Maintaining greater flexibility to react to behavior that does not reflect the Council's intended objectives reduces the need to project each negative outcome that may arise.

Fixed-term privileges could allow Council's greater flexibility to modify a program if it is not meeting its objectives, especially in regards to performance standards by the harvesting/processing sector and the program's impact on other stakeholders. This can be important when a LAP program is being developed to specifically modify behavior associated with PSC usage. For example, if the initial allocation of quota is deemed inappropriate, a short, fixed-term privilege would allow the Council to re-adjust the allocation to better suit the goals of the program. Periodic program adjustments may also ensure that community access and other potential goals are being reached (Cullenberg).

The U.S. Commission on Ocean Policy's Recommendation 19-15 proposed that the National Marine Fisheries Service be responsible for issuing national guidelines for catch share programs; it outlined several key features, one of which was limiting the duration of quota shares. The Commission determined that allocating fixed-term privileges was an effective tool to help ensure that catch share programs meet current and future objectives.

#### 5.2.1.2 Fixed-term allocations can provide opportunities for change

Unintended consequences may result from the initial allocation of privileges, in addition to less than optimal economic outcomes of an initial allocation<sup>10</sup>. Fixed-term privileges offer resource managers potential flexibility to redistribute allocations based on defined criteria. As a result, changes in policy may be implemented more easily, and with less resistance under a system of time-limited rights (Macinko and Bromley 2001). While the resistance of future redistribution of quota may be lessened, resistance to the program by some stakeholders may increase.

Fixed-term privileges provide managers with predictable regular intervals at which to make changes to the management program in light of new developments. Privilege holders also have a high degree of certainty about when changes to the system will be made in order to plan accordingly. There may be less resistance to changes in management procedures if the privilege holders do not hold a permanent, vested share in the industry. Fixed-term privileges may also provide a regular interval for checks on any active participation requirement on shareholders, if the Council takes that approach to promoting an owner-operated fleet.

In the context of the rapidly changing understanding of the oceans and the shift towards ecosystem-based science and management (Upton, et al. 2007), this flexibility may make it easier for adaptive management to occur. For example, The United States Commission on Ocean Policy (2004) recommended assigning quota shares for a limited period of time to reduce confusion concerning public ownership of living marine resources, allow managers flexibility to manage fisheries adaptively, and provide stability to fishermen for investment decisions.

#### 5.2.1.3 Windfall gains can be reduced

One concern about long-term privileges is that they capitalize the value of the fishery and therefore, when traded, confer benefits to the initial recipients in the form of windfall gains (if the initial allocation is free or cheap). These may be viewed as inequitable from society's standpoint. The Redstone Group (2007) modeled the economic gains of implementing a Limited Access Privilege Program (LAPP) in the snapper-grouper fishery under the jurisdiction of the South Atlantic Fishery Management Council (SAFMC). They found that implementing the LAPP would provide \$15-20 million in benefits, much of which would come from consolidation and de-capitalization in the fishery. However, they also found that most of these gains could be taken out of the fishery in the form of quota purchased from exiting privilege holders.

LAP programs have sometimes been viewed as a transfer of the resource's enhanced future value to a limited stakeholder group that was "chosen" by the program's particular qualification scheme. When initial privilege recipients capitalize a portion of the stream of future benefits, thereby depriving future fishery participants of those benefits, the resulting effect is known as the transitional gains trap. Fixed-term privileges may help avoid the transitional gains trap.

The PFMC's SSC argued that this is a "rather simplistic view of the transitional gains trap argument and it reflects a misunderstanding of the concept of resource rents and confuses several important issues". That SSC also noted that the paper views rents as somehow unearned and a windfall to those who receive them. However, a significant portion of the asset value of a resource arises from rents generated by the innovation and enterprise of the resource extracting. These resource rents are very different from unearned monopoly rents or windfall gains and arise because natural resources, like any other economic good, are scarce and can be sold for a price

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<sup>10</sup> Which can in part be corrected through efficient market based transfer provisions.

which is higher than the costs of extraction. Unlike monopoly rents and windfall gains, resource rents can represent efficiency and sustainability and therefore are a benefit to society.

Creating a LAP program with either fixed duration or a relatively unlimited or “rolling” duration does two things:

- It allows those who have created an asset value for the resource through investment, innovation and entrepreneurship to capture a portion of that value through the sale or leasing of privileges.
- It encourages new entrants to enter a sector because they now have the potential to extract a proportional share of the future benefits created from rents generated by their ongoing investment, innovation and entrepreneurship.

#### 5.2.1.4 Limited duration quota could address use it or lose it provisions

Limited duration quota programs could easily address “use it or lose it” provisions. The notion is that if the holder of an exclusive privilege to harvest a portion of the nation’s fish stocks does not use it, it should be turned over to someone who will. Otherwise consumers will have access to less fish and the opportunity to provide earnings to the industry will be lost. A use it or lose it policy would also preclude individuals, including NGOs, from acquiring privileges and taking independent conservation actions by allowing some fish to remain in the water. Section 303A(c)(5)(E) on LAP allocation requirements would allow the Councils or the Secretary to condition the allocation of privileges through their definition of “substantial participation”. Thus, privileges can be held or acquired by persons who substantially participate in the fishery, and Councils do have the option of including a use it or lose it provision in the plan. Holders who do not comply would lose their permits.

#### 5.2.1.5 Auctions fit well with limited duration programs

If the Council wishes to allocate shares by an auction, a fixed-term allocation policy where some or all of the permits are recalled periodically and resold could provide a continuing source of revenue. If shares are reallocated using a performance standard, that performance standard is the currency used to acquire shares. Persons that exhibit the most desirable behavior, as defined by the Council, could be rewarded with additional quota when it is reallocated. Rewarding that behavior increases the likelihood that individuals<sup>11</sup> will work to achieve the standards defined by the Council.

### 5.2.2 Detriments of Limiting Duration

#### 5.2.2.1 Limited Duration Quotas May Reduce Efficiency

Detriments of limiting duration are primarily incurred by the persons that are initially allocated quota. By allowing the privilege to be as permanent as current policy allows, the owner of the quota will have the securest planning horizon and will have better incentives to make efficient investments in harvesting and processing equipment and to develop market channels. Longer term privileges are expected to generate greater economic returns to the quota holder than shorter term privileges. Thus, on economic efficiency grounds, a permanent quota is generally considered superior to a fixed term quota.

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<sup>11</sup> However, it may also be in their best interest that others do not achieve that standard, as it could affect their ability to increase their allocation.

Similar findings were reported by the SSC for the Pacific Council when it reviewed the preferred option for the Pacific Council's Trawl Individual Quota relative to fixed term auctions (PFMC). Its review indicated that the Council's program provided greater economic benefits to persons receiving an initial allocation relative to fixed term auctions.

*"Analysis of the Council's preferred option relative to the combined fixed term/auction options reveals that the preferred option generates greater benefits across almost the entire range of management objectives. These results are influenced by key characteristics of the West Coast Limited Entry Groundfish Trawl Fishery including: 1) the large number and complexity of assemblages and species; 2) stock rebuilding and bycatch constraints; 3) management focus on protecting small firms; 4) effects of the self-financed buyout program; and 5) number and diversity of dependent/engaged communities results in higher rents and economic efficiency through incentives for entrepreneurial innovation and reduction in risk. In contrast, the fixed term/auction alternatives generate less profit and rent and lead to greater risk due to "wasting effects" and disincentives for rent creation. These effects are magnified over time due to the inherent challenges in managing asset portfolios in a complex multispecies fishery. In addition, the reduction in asset values undermines the ability of family-owned firms to finance operations and manage risk. The fixed term/auction alternatives reduce incentives for stewardship, and negatively impacts communities by increasing risk and inhibiting long term contracting. The auction system may provide for moderate gains in new entrants and price discovery but this is a benefit only if secondary quota markets are failing to function efficiently."*

While the benefits to persons receiving an initial allocation are greater under long-term allocations, benefits to other stakeholder are potentially greater under a fixed-term duration program. Therefore, it is important to consider the impacts on all stakeholders relative to the Council's stated goals and objectives. Achieving the desired balance of benefits may result in a less optimal program design for persons receiving an initial allocation, so that potential negative impacts to other stakeholders are mitigated.

#### 5.2.2.2 Limited duration privileges may increase transaction costs

Transaction costs are the resources dedicated to establish, operate, and enforce a market system (Lee and Jouravlev 1998). Permanent privileges are homogenous in duration so their value is determined solely by the factors underlying supply and demand. Privileges subject to a fixed-term, however, are a "wasting asset" i.e. their value diminishes with time (Hodgson 2006). Higher information and renewal costs may be associated with renewing or replacing fixed term assets. These costs will be higher the greater the degree of uncertainty associated with the status and/or management of the resource. Permanent privileges can help avoid potentially contentious, time-consuming, and costly future re-allocations (Libecap 2006; Morgan 1995).

As stated above, a program developed to reallocate quota could be more costly, complicated, and time consuming for industry, the Council, and NMFS. Each year that quota are reallocated, the Council and/or NMFS would need to structure or administer the reallocation process and industry would need to meet the application requirements. Depending on the criteria developed, this process could be controversial and will increase the costs of participating in and managing the program. Management costs that result from the LAP program will be passed on to the quota holders through a cost recovery fee. As a result the quota holders expected benefits are decreased and their costs are increased to pay obligations incurred to manage the program.

#### 5.2.2.3 Limited duration privileges can discourage efficient investment

Secure use privileges reduce risk, thereby promoting long term investment and technological improvements (White 2006). Investment and innovation by firms collectively improve the economic efficiency and competitiveness of a sector (Bess 2006; Harte, et al. 2008; Harte and Barton 2007). For example, if a fishing entity does not know if they will have the right to fish in five years it is less likely to make new capital investments in equipment and durable assets. In sectors where markets take a long time to establish, permanent or long term access to the resource is more conducive to the formation of more efficient business arrangements (Bess 2006).

#### 5.2.2.4 Limited duration privileges may reduce resource stewardship

Long-term privileges can promote resource and environmental stewardship. Secure privileges to harvest natural resources may encourage stewardship for the resource and the environment it is found in (Morgan 1995). The longer the duration of the privilege, the larger the stake the user has in the industry and the greater the user's desire to engage in long term stewardship behavior (Beddington, et al. 2007; Costello, et al. 2008; Grafton, et al. 2006; Griffith 2008; Townsend and Shotton 2008).

Recent modeling work by Costello and Kaffine (2008) shows that the value, growth characteristics, and duration of the harvest privilege all impact incentives for resource stewardship and economic efficiency. Modeling the abalone and spiny lobster fisheries in Baja California, Mexico, the authors demonstrate how limited duration privileges could induce resource stewardship. However for slower growing stocks, either a long tenure period or high certainty of renewal is required to induce stewardship. This finding is consistent with work by Larkin et al. (2006) who showed that stock growth rates fundamentally impact the economically efficient management strategy for overfished stocks required to meet a mandated rebuilding target. Importantly, Costello and Kaffine show that a tenure system will encourage stewardship depending on the tenure length, the probability of renewal (as a function of the probability of achieving a predetermined "escapement" level), and the economic and biological characteristics of the fishery. Although modeled for relatively high value single species fisheries, this work demonstrates the context-specific nature of the complex relationship between stock characteristics, duration of fishing privileges and the certainty of privilege renewal.

In contrast, Macinko and Bromley (2001) argue that the degree of long term stewardship that a user will exercise is determined not by the duration of the privilege but by the user's rate-of-time preference -- that is, how an individual evaluates present income versus future income. Individuals with a higher discount rate are less likely to care for the long term health of a resource. If enough fishery participants have a high discount rate, the economic incentive to ensure the long term sustainability of a resource will be much reduced because the sector believes short term gains are better employed in other uses. The effects may mean that time limited privileges have the same implications for resource and environmental stewardship behavior as do permanent privileges, provided they are of sufficient length.

### 5.3 Performance Incentives

Performance incentives for the trawl bycatch management program could focus on PSC usage, since PSC management modifications are the primary impetus for development of this action. It is important to note that PSC is an input in the overall production process to harvest GOA groundfish. Harvesters will utilize a suite of inputs to limit production costs with the goal of maximizing profit. If policy makers determine that too much PSC is being used, increasing the

“cost” of PSC may result in harvesters changing the quantities of various inputs they use. For example they may increase funding for trawl gear modification research with the goal of reducing PSC.

It is also worth noting that the cost of PSC is viewed differently by various stakeholders. People that use PSC as an input for other target fisheries place a high value on PSC species for use as PSC. Persons that target halibut or Chinook (and other sectors of society) place a lower value on those species when being used as PSC, but place a higher value on those fish when they are being used for stock rebuilding or directed fisheries for those species.

The goal for the Council is to create incentives that place the appropriate value (based on Council objectives) on PSC while meeting National Standards 1 and 9. Based on the Council’s problem statement, the price of PSC should be sufficiently high to individuals to minimize its use. This likely means it is considered a potential constraint on target harvests, costs an appropriate amount of money, or results in potential loss of quota shares to use privileges.

Allocations to groups of individuals, where one individual has no control over the others’ behavior, distorts the value individuals place on PSC (Zabel 2009). This situation currently occurs in the GOA trawl fishery. For individuals to internalize the cost of PSC they should be directly responsible, either individually or collectively, for its use as an input to their production process. At that point persons with relatively high PSC rates could be penalized through a reduction in their annual allocation of PSC, target specie, or both. That quota could be redistributed to other participants that have relatively low PSC rates. The process to achieve this would require the Council to develop the rules for redistribution. It would also place additional pressure on the observer program to provide data that allows managers to determine how quota should be redistributed on an annual or other periodic basis. The initial allocation could be based on historical participation, a promise of future performance, or a combination of the two.

If an allocation is based on a promise of future performance, then a set of rules must be developed to specify the actions that will be taken if that promised performance is not met. Assurance bonds have been used in other industries to ensure that a performance standard is achieved<sup>12</sup>. Persons not meeting the promised standard could forfeit the bond to NMFS. However, the use of assurance bonds can be complicated to manage and enforce and would require an appeals process. Another method would be to reduce allocations for poor performance. The reallocation of quota could go to persons that exhibit high performance standards or other entities that the Council wishes to protect (eg, Fishing Communities).

When entities are judged relative to their peers, and quota is redistributed based on that review, it may reduce the incentives for cooperation among the fleet. If persons are unwilling to share data because it may improve others’ PSC rates relative to their own and those rates determine future allocations, the overall PSC usage rates could increase. Therefore, careful consideration should be given to programs that reduce incentives for industry to cooperate and share data that could be used to reduce overall PSC usage, to ensure that the overall goals of the program are not compromised.

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<sup>12</sup> Examples include aquaculture and the oil and gas industry, where assurance bonds were used to ensure site remediation after use of the granted or purchased term of concession was complete.

## 5.4 Non-monetary auctions

The MSA requires that the Council consider using an auction format as a means to allocate quota in a catch share program. The Council may choose to reject auctions, but in so doing it must state why auctions do not meet the outlined goals and objectives of the program. In designing an auction format, the Council must consider six things: current harvest, historical harvests, employment in the fishery, investments in the fishery, participation in the fishery, and dependence on the fishery.

Cases from recent history where auctions were used in fisheries involved monetary auction formats. Fishery privileges were auctioned in the Russian Far East from 2001-2003 (Anferova et al. 2005), in Estonia from 2001-2003 (Vetemaa, et al. 2001; Vetemaa, et al. 2005), and in Chile for the Patagonian toothfish fishery (Gonzales, et al. 2001). Auctions of any type can be subject to collusion or gaming by potential bidders and may not reflect the maximum PSC savings that could be realized. Each of these monetary auction systems has been compromised by collusion during the bidding process. The limited use of auctions in fisheries appears due to concerns about distributional impacts, perceived complexity of design and administration, and a lack of popularity with fishery participants and administrators vis-à-vis non-auction alternatives.

Some design features are common to most auction formats; these include the frequency of the auction, who may participate in the auction, and the amount of the total auctionable pool that is available at each iteration of the auction (if applicable). The frequency of the auction may be linked to the duration of the privilege, discussed above. In short, long-term access privileges promote stability, while shorter-term privileges could induce competition<sup>13</sup>. In order to reach program goals – such as assisting entry-level fishermen, supporting fishery-dependent communities, or preserving participation in a specific area or sector – it may be desirable to partition the auctionable pool and restrict who may take part in the auction for that parcel of quota. For example, a predetermined amount quota could be set aside and auctioned only to participants from a certain vessel class, operational type, or regulatory area. Similarly, a portion of the resource could be set aside and held out for use in a future auction round – in a future year, or later in the auction year – where auction participation is conditioned on performance incentives (see Section 5.3). Dividing the quota pool and staggering the auctioning of each “tranche” over years may reduce participants’ uncertainty in their future stake in the fishery. It may upset the stability in participation that is so crucial to business investment and to effectively approaching optimum yield if entities see their entire stake in the fishery open to competition at a single moment in the near future, or even years down the road.

The Council has requested an exploration of non-monetary auction options. Non-monetary auctions can be designed to take both social and political goals into account. A non-monetary auction could be structured in many different ways, but any format would feature some alternative form of bid currency. If bycatch management is the central driver of an auctioned quota program, the most likely bid currency would be some form of PSC commitment. This is true regardless of whether the shares to be allocated are quota for target harvest (IFQ), or quota for bycatch allowances (IBQ). The Council would need to consider whether participants would commit to a certain level of PSC in terms of the number of fish (e.g., Chinook salmon), tons of mortality (e.g., halibut), a PSC ratio (PSC units per metric ton of groundfish harvest), or some combination thereof.

<sup>13</sup> As discussed in the previous section, there are positive and negative aspects to promoting competition in bycatch avoidance. Competition could increase incentives to perform to higher standards, but could also reduce cooperation among participants if any privilege gained through superior performance comes at the expense of opportunities for other entities. Also see Guasch 2004.



In general, auctions provide a suite of economic and management benefits, some of which tie in with the discussion of limited duration quota allocations. Auctions are a price discovery mechanism; bidding participants indicate (to varying degrees of accuracy, depending on the auction design) their willingness to “pay” for access to the resource. The price paid could be in the form of capital investment in new technology, or in the form of opportunity costs incurred while altering behavior to pursue a PSC-reducing harvest strategy. Compared to a free allocation based on historical participation, an auction elicits the cost that different types of participants can bear to avoid bycatch<sup>14</sup>. In a limited quota duration setting, auctions with an iterative performance-based structure create an incentive to avoid bycatch at all times. Auctions reduce the opportunity for windfall gains and, consequently, reduce the likelihood that the market will be distorted by a high volume of quota hitting the market after an initial free allocation where many participants receive small, uneconomical allocations<sup>15</sup>.

Compared to traditional auctions, non-monetary auctions that utilize some form of PSC commitment as a bid currency may provide less of a relative advantage to participants with superior access to cash. The law of diminishing returns suggests that an entity with more money values each dollar less than would an entity with less money; therefore, a monetary auction would inherently favor participants with greater cash resources. If one accepts the imperfect assumption that avoiding PSC carries the same cost for all participants (of a given sector, at least), non-monetary bidding should be more equitable across a diverse set of participants.

While non-monetary auction systems could be developed to serve social or community goals, some economic efficiency benefits might be lost. Set-asides or “price” preferences for minority groups may be politically desirable, but could also introduce distortions that reduce the economic benefit of auctions for the broader set of stakeholders. For example, reserving some amount of auctionable access for new entrants or remote communities would likely reduce the amount of quota that would otherwise go to the entities with the greatest willingness to pay for the access. In cases where social and community objectives are deemed more important than economic efficiency, the Council may choose to accept reductions in economic efficiency.

Several potential disadvantages should be considered. First, in relation to the previous assumption about the cost of PSC reduction, it is quite possible that participants in the fishery will experience varied cost-levels associated with PSC avoidance. Even from a non-monetary perspective, entities that are associated with an existing cooperative management group<sup>16</sup> may have greater access to bycatch management tools. (This point may be moot if the program resulting from this potential action involves mandatory membership in a cooperative.) Alternatively, differential access to PSC avoidance tools could be an endorsement for partitioning the available pool of quota share and holding separate auctions for user groups with different management capacity. In a similar vein, entities that participate in PSC-intensive fisheries, such as the GOA spring flatfish fishery, may be relatively disadvantaged in non-monetary auction formats with PSC-based bids. Second, asymmetrical information is always a concern in competitive bidding programs (Wunscher 2012). For example, business operations that are engaged in both harvesting and receiving shoreside

<sup>14</sup> It would be incumbent upon the Council to ensure that the fishery is still able to achieve a harvest level approaching OY while participants bear these costs. Individuals would likely remain in the fishery as long as their expected socioeconomic returns remained greater than some other form of employment. A fleet comprised of many individuals who are meeting their personal opportunity costs by a slim margin is not guaranteed to produce at the optimal level of effort, or catch per unit of effort.

<sup>15</sup> This effect was observed in the early years of the Halibut/Sablefish IFQ Program. It may be less of a concern when considering only the GOA groundfish trawl fishery, which has fewer participants who tend to operate on a relatively more equitable scale.

<sup>16</sup> Such as a Rockfish Program, Amendment 80, or AFA cooperative.

landings for processing may have greater knowledge about how much PSC other bidders have been recording, and what they could reasonably bid. Third, participants may speculate that any program aimed at a long-run reduction in PSC will eventually improve the fishery's overall bycatch performance, and that the managing authority would then want to update performance standards – making them more strict. Anticipating this downstream reaction, participants may have an incentive to collectively under-bid their potential bycatch performance in order to avoid imposing future costs on themselves (Chen 2008). The Council could mitigate this undesirable outcome by specifying the period of time for which the auction design and any performance metrics would be set without the possibility of revision.

The following outlines several auction formats that are either non-monetary in nature, or have non-monetary components and/or a built-in performance incentive. Any non-monetary design where resource access is granted on the basis of a promised future performance level should include a well-defined contract ensuring that the entity gaining the concession has every reason to live up to the contractual promise (Guasch 2004):

- *Pure non-monetary bidding.*

The simplest non-monetary auction design would solicit simultaneous blind bids from those desiring access to a common resource pool, and award access to as many users as possible until a collective use cap is met. In order to maximize the number of admitted users, access would be awarded beginning with those who request the smallest amount. This strategy has been employed in controlling admission to wireless networks in a scenario where total bandwidth capacity is limited (Kang et al, 2010). This approach has two main drawbacks: participants have an incentive to lie, in order to gain admission and derive at least some benefit from the resource; and the managing authority cannot guarantee the number of participants who will be admitted under the collective cap without knowing the level of the bids ex ante. The manager could set a “reserve price,” or a maximum bid-size that would be eligible for admission. This would give the designer more control over how many individuals would be admitted, but may differentially exclude those who are not able to bid below the reserve price.

- *Two-sided matching.*

The managing authority would receive simultaneous blind bids. A designated third-party would make allocations based on an established set of preferences and criteria, which could include a total resource cap or a desired number or distribution of admitted users. The concept of decentralized decision-making in a complex environment has been applied to the matching of medical school graduates with residency programs. The strategy's success was to end a snowballing cycle of recruiting games, where students were recruited and forced to commit to a program earlier and earlier in their educational career (Roth et al, 1990). This negative outcome is analogous to fishery participants who share a constraining resource cap and race to act first, thereby reducing the fishery's total net benefit.

- *Multiple factor auction.*

Agencies managing either public resource use rights (offshore wind development sites, Ausubel 2011) or public incentive program funds (solar energy installation, reforestation; Black 2005, Wunscher 2012) have employed two-stage auction formats that have a non-monetary component. In either case, bidders submitted a proposal detailing their capacity to produce net public benefits while operating within the bounds of established program criteria and performance measures. In the first stage, proposals were reviewed by a third-

party, and a panel awarded bid credits or bid multipliers to preferred applicants. Any credits could be applied in the second stage, when a conventional auction takes place. Review of first-stage proposals would be subjective, by nature, but the managing authority will have published an explicit set of criteria for preferred proposals beforehand. In an iterative auction program, entities that performed to their bid level in previous time periods may receive special consideration from the panel in later auctions.

- *Assurance bonds.*

Financial assurance bonds have been used to ensure the types of performance commitments that could be made in a non-monetary auction. In a bycatch management scenario, participants could be required to secure a bond in order to participate in the auction. The bond could be recouped if the participant abided by their bid commitments to manage PSC to a certain level. PSC hard caps, for individual entities or collectives, would remain in place. The bond payment would be a deterrent to under-bidding the amount of PSC required for an individual to harvest their share of target quota; this would also reduce the likelihood that many participants will underbid, be closed out of the fishery, and detract from the ability of the fleet to harvest near OY levels on aggregate.

Making resource concessions contingent upon the purchase of a bond that is worth the expected social cost of the potential harm incentivizes regulatory compliance and deters short-sighted profit motives, while also giving comfort to the public trust (Boyd 2001). In other resource fields, such as aquaculture or oil and gas extraction, assurance bonds were employed to privatize the risk that environmental harms like unremediated sites would impose a public cost. If existing PSC cap levels remain in place, the social cost of concern would be failure to harvest groundfish within the constraint; this would actually be much easier to price in an actuarial sense than, say, the social cost of taking too many Chinook salmon as trawl bycatch. Environmental assurance bonding is most effective when the number of parties potentially causing harm is small and easily identifiable, when the activities that cause harm are observable, and when the negative effects or not irreversible (which would be the case with PSC hard caps held in place).

Auction design may be more complicated for fisheries resources than for other natural resources, and the potential for unintended consequences far greater. Traditional revenue auctions appear most effective in new fisheries with few participants or a significant history of industry participation, such as the Chilean Patagonian toothfish fishery, and where catch history allocations have not been made in the past (Gonzales, et al. 2001). In the context of existing management complexities, it could be expedient to design a non-monetary auction system around existing institutions such as organized fishing community groups, harvest cooperatives, or any CFAs that are established as part of the considered program.

## 6 Bibliography

- Anderson, L. G. and M. C. Holliday. 2007. *The Design and Use of Limited Access Privilege Programs*: NOAA Fisheries Service - Office of Policy, U.S. Department of Commerce.
- Anferova, E., M. Vetemaa, and R. Hannesson. 2005. Fish quota auctions in the Russian Far East: a failed experiment. *Marine Policy* 29:47-56.
- Arnason, R. 2001. *A Review of International Experiences With ITQs*. Portsmouth: University of Portsmouth.
- Ausubel, L.M., P. Cramton. 2011. Multiple Factor Auction Design for Wind Rights. Power Auctions LLC and Market Design Inc. Prepared under BOEMRE Contract M10PC00106. Available at: <http://www.cramton.umd.edu/papers2010-2014/ausubel-cramton-auction-design-for-wind-rights-paper2.pdf>.
- Beddington, J. R. D, J. Agnew, and C. W. Clark. 2007. Current Problems in the Management of Marine Fisheries Science. *Science* 316(5832):1713-1716.
- Black, A. 2005. Performance based incentives for photovoltaic (PV) via auction. OnGrid Solar Energy Systems & American Solar Energy Society. Presented at Solar World Congress 2005, Orlando, FL, USA. Available at: <http://www.ongrid.net/papers/PBIViaAuctionSWCph.pdf>.
- Boyd, J. 2001. Financial responsibility for environmental obligations: are bonding and assurance rules fulfilling their promise? Resources for the Future. Discussion Paper 01-42
- Chen, J. 2008. Essays on auction mechanisms and resource allocation in keyword advertising. University of Texas at Austin: UT Electronic Theses and Dissertations. Available at: <http://repositories.lib.utexas.edu/handle/2152/17803>.
- Costello, C. J., S. D. Gaines, and J. Lynham. 2008. Can catch shares prevent fisheries collapse? *Science* 321:1678-1681.
- Costello, C. J. and D. Kaffine. 2008. Natural resource use with limited-tenure property rights. *Journal of Environmental Economics and Management* 55(1):20-3.
- Cullenberg, Paula. Coastal communities. The future of Alaska's small fishing communities. Anchorage: Sea Grant, 2006.
- Group, The PEW Environment. "Design Matters: Making Catch Shares Work." 2009.
- PFMC. Potential Trailing Actions on Trawl Rationalization. Portland: Pacific Fishery Management Council, 2010.
- . Why Define Community Fishing Associations. Portland, 2009.
- U.S. Government Accountability Office. Individual Fishing Quotas: Methods for Community Protection and New Entry Require Periodic Evaluation. GAO-04-277. Washington: GAO, 2004.
- . 2010. Economic And Policy Analysis Of A Fixed Term Auction-Based Individual Fishing Quotas Proposal For The West Coast Limited Entry Groundfish Trawl Fishery; Appendix F To The Rationalization Of The Pacific Coast Groundfish Limited Entry Trawl Fishery Final Environmental Impact Statement. Portland.

Redstone Strategy Group, LLC. South Atlantic Snapper Grouper LAPP Options: Preliminary economic and design input. 2007. Boulder, CO, Redstone Strategy Group, LLC.

Roth, A.E., Vande Vate, J.H. 1990. Random paths to stability in two-sided matching. *Econometrica*, Vol. 58(6): 1475-1480.

Townsend, R. and R. Shotton. 2008. Fisheries self-governance: new directions in fisheries management. In *Case Studies in Fisheries Self-Governance*, edited by Townsend, R., R. Shotton, and H. Uchida. Rome: FAO.

Upton, H. F., J. R. Justus, and E. H. Buck. Ocean Commissions: Ocean Policy Review and Outlook. 2007. Washington, D.C., Congressional Research Service. Congressional Research Service Report RL33603.

Vetemaa, M., M. Eero, and R. Hannesson. 2001. The Estonia fisheries: from the Soviet system to ITQs and quota auctions. *Marine Policy* 26:95-102.

Vetemaa, M., M. Eero, and R. Hannesson. 2005. Fishing rights auctions in the fisheries of Lake Peipsi-Pihkva, Estonia. *Fisheries Management and Ecology* 12:309-313.

Wunscher, T., M. Khalumba, K. Holm-Muller, M. Budenbender. 2012. The cost-effectiveness of combining reforestation auctions with performance based payments – a field trial in rural Kenya. Presented at ISEE Conference – Ecological Economics and Rio+20: Challenges and Contributions for a Green Economy, Rio de Janeiro, Brazil. Available at: <http://www.ongrid.net/papers/PBIViaAuctionSWCph.pdf>.

Zabel, A., B. Roe. 2009. Performance payments for environmental services: lessons from economic theory on the strength of incentives in the presence of performance risk and performance measurement distortion. Working Paper 7. Institute for Environmental Decisions.